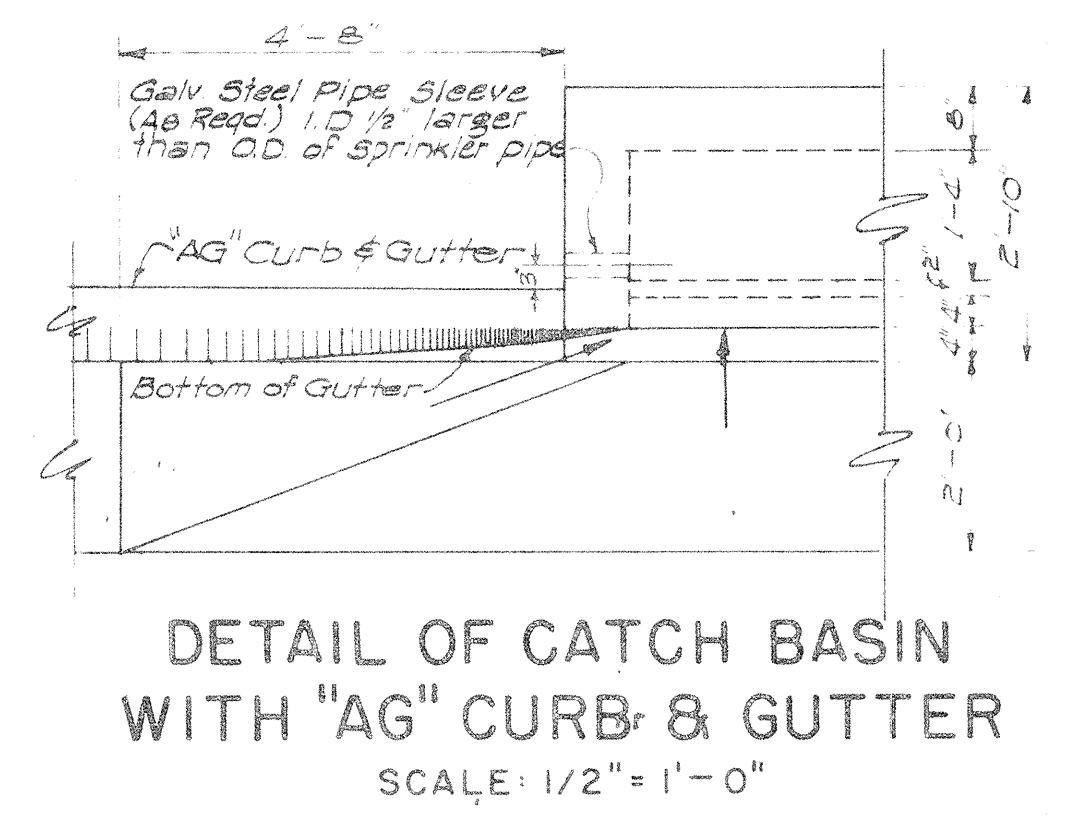
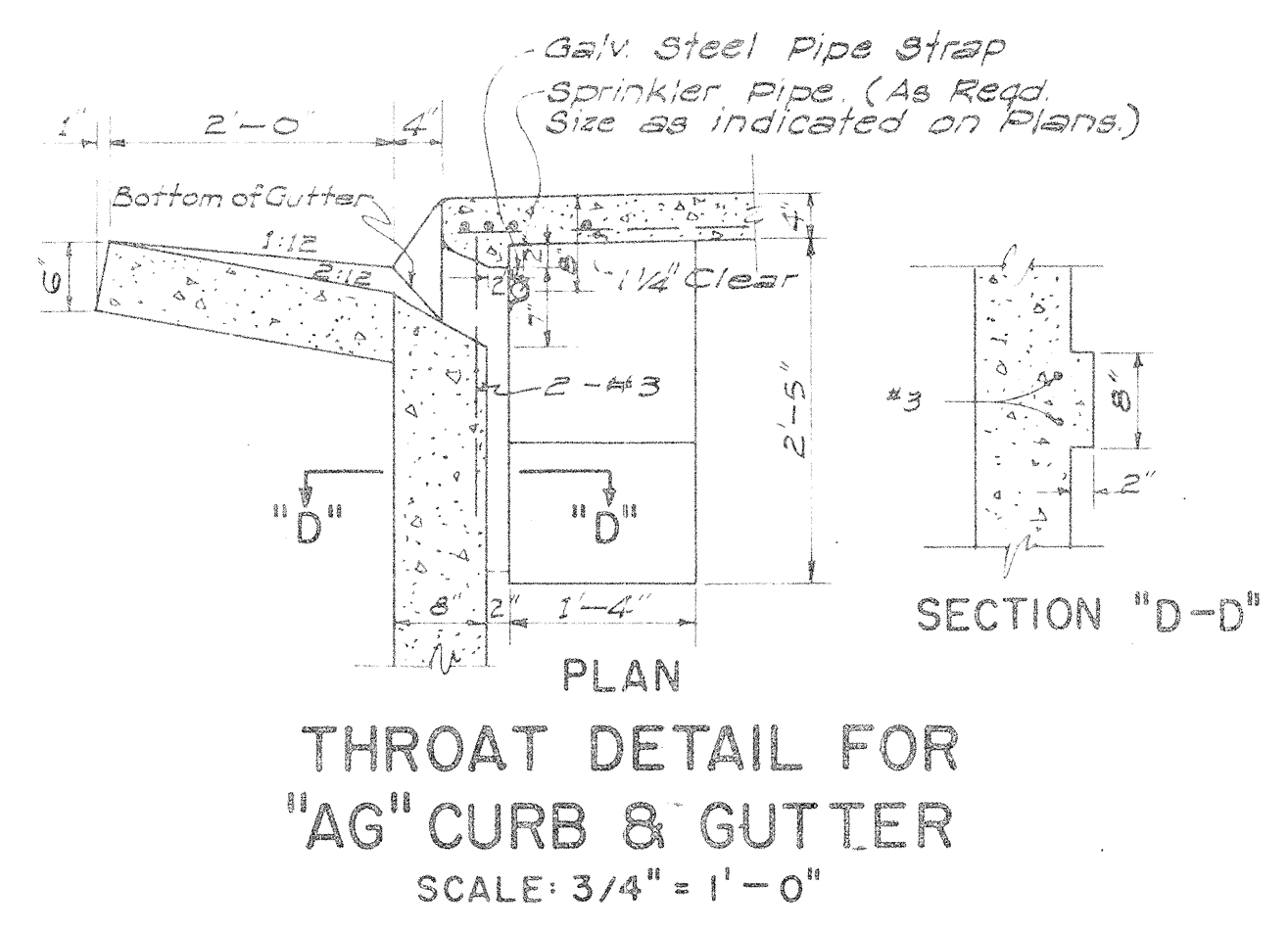
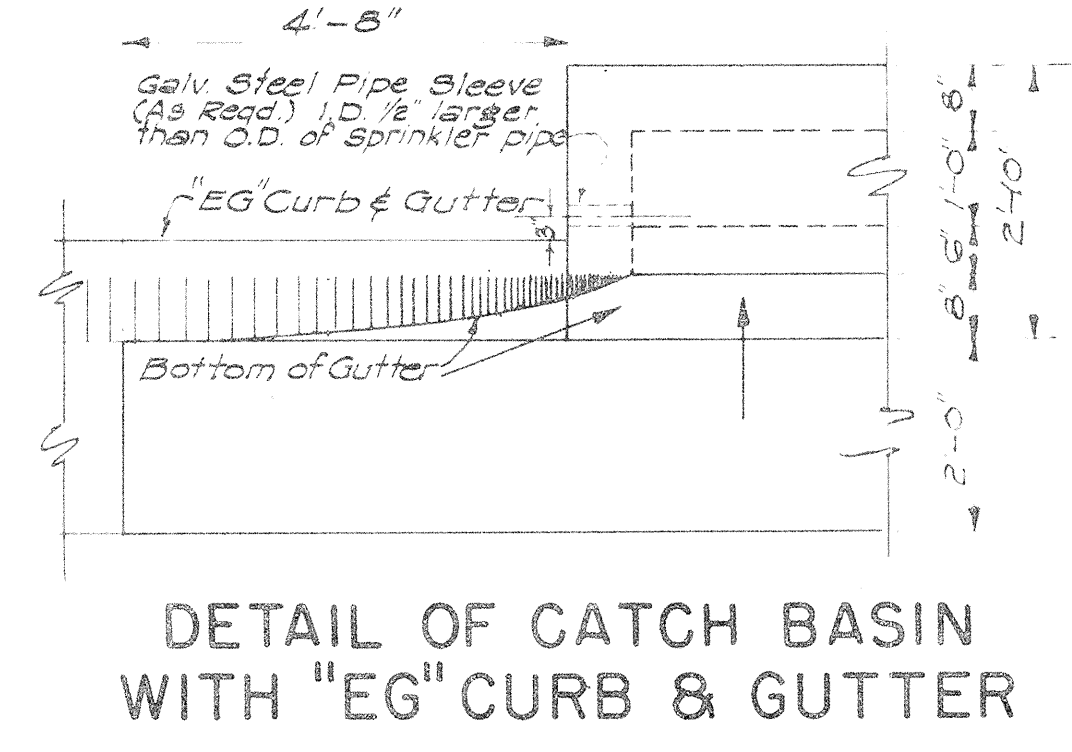
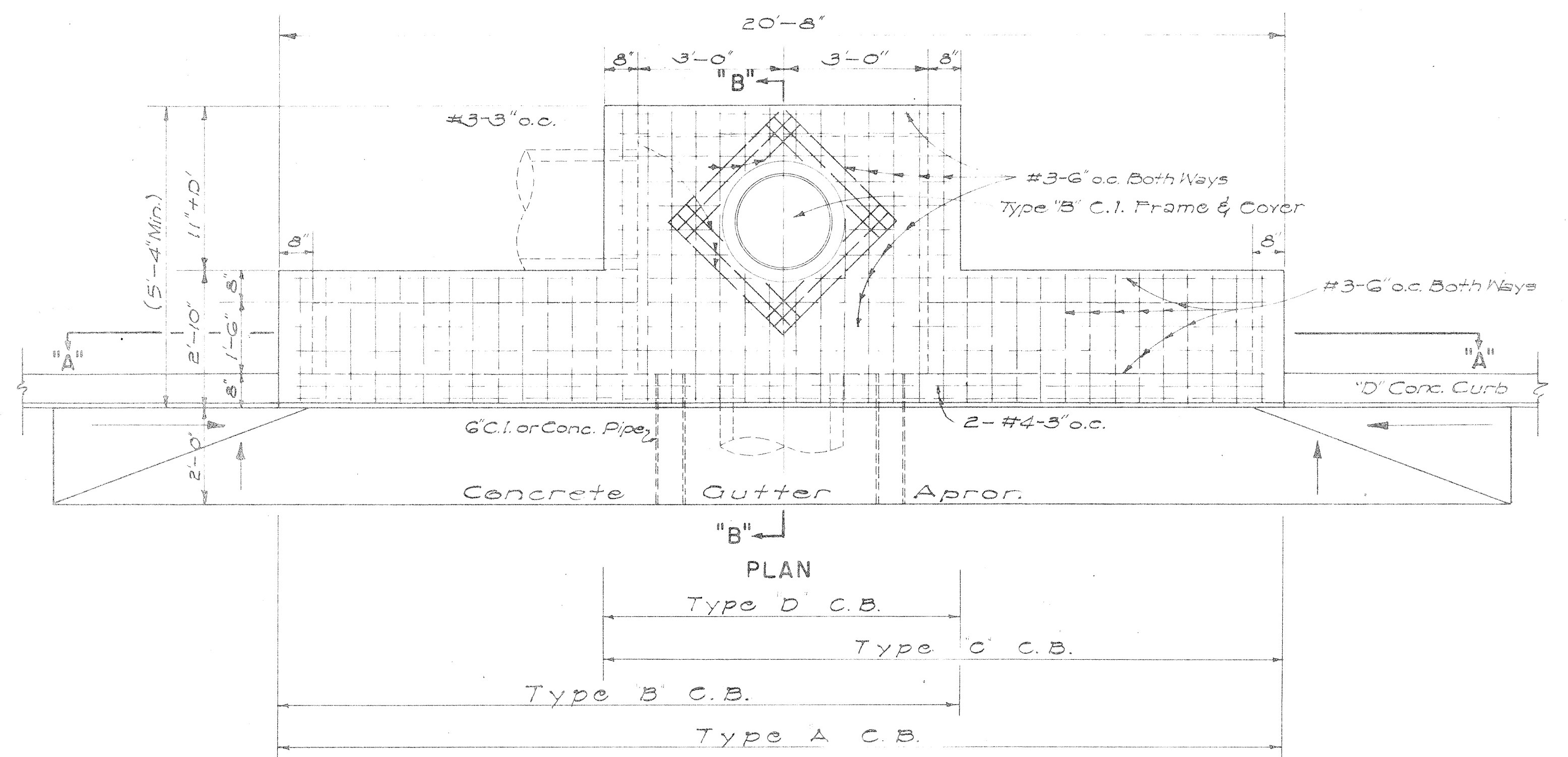
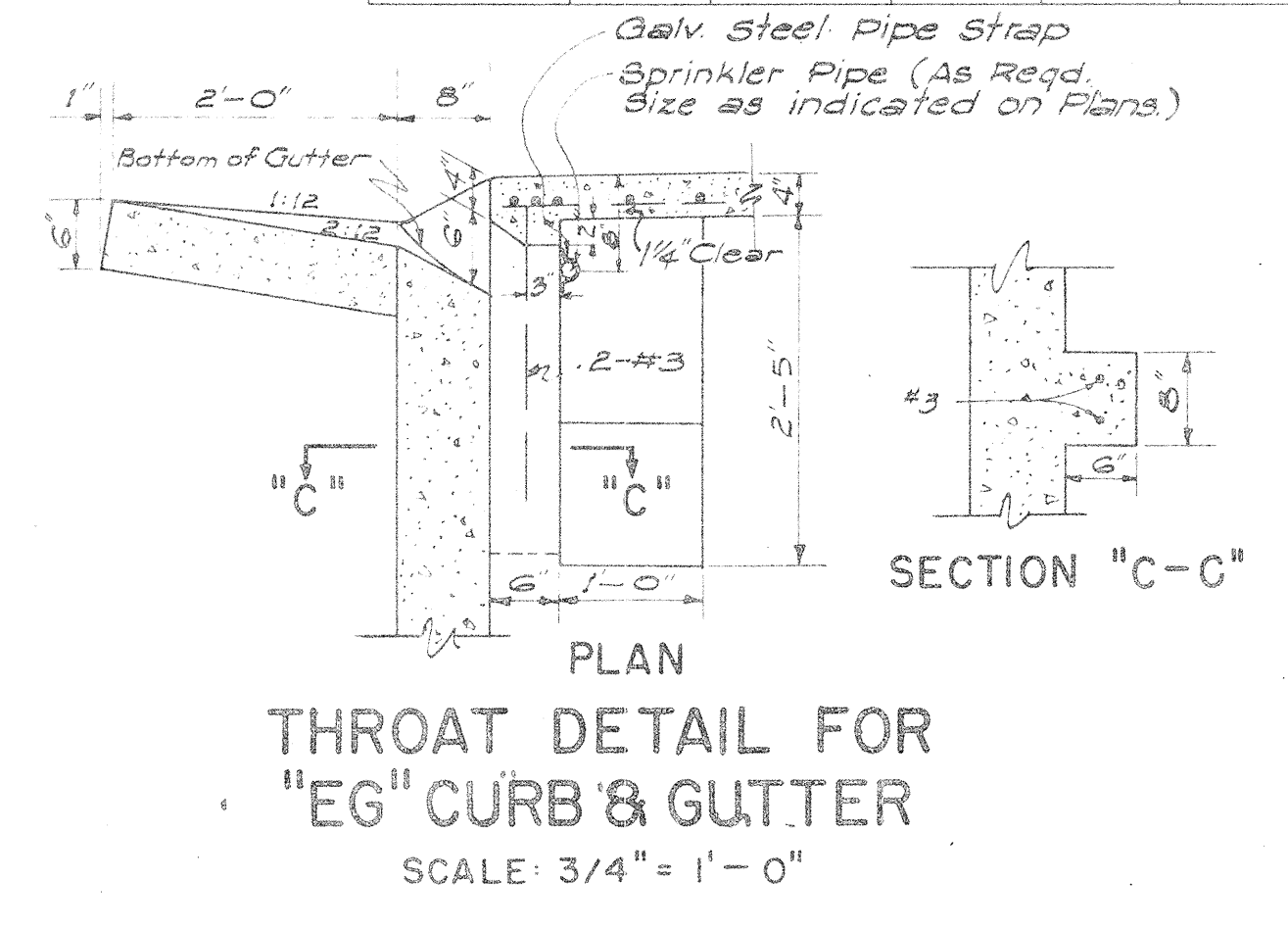
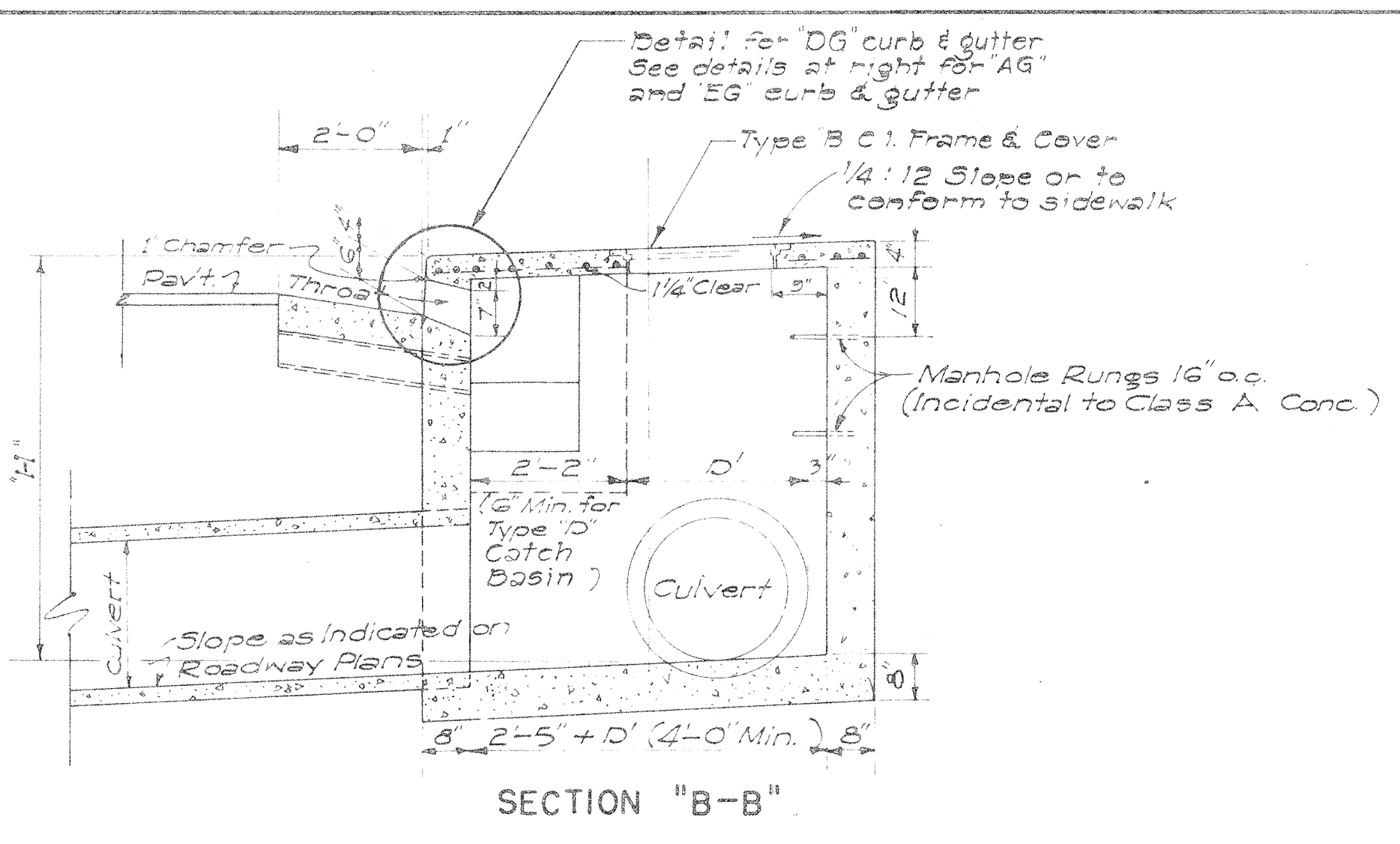
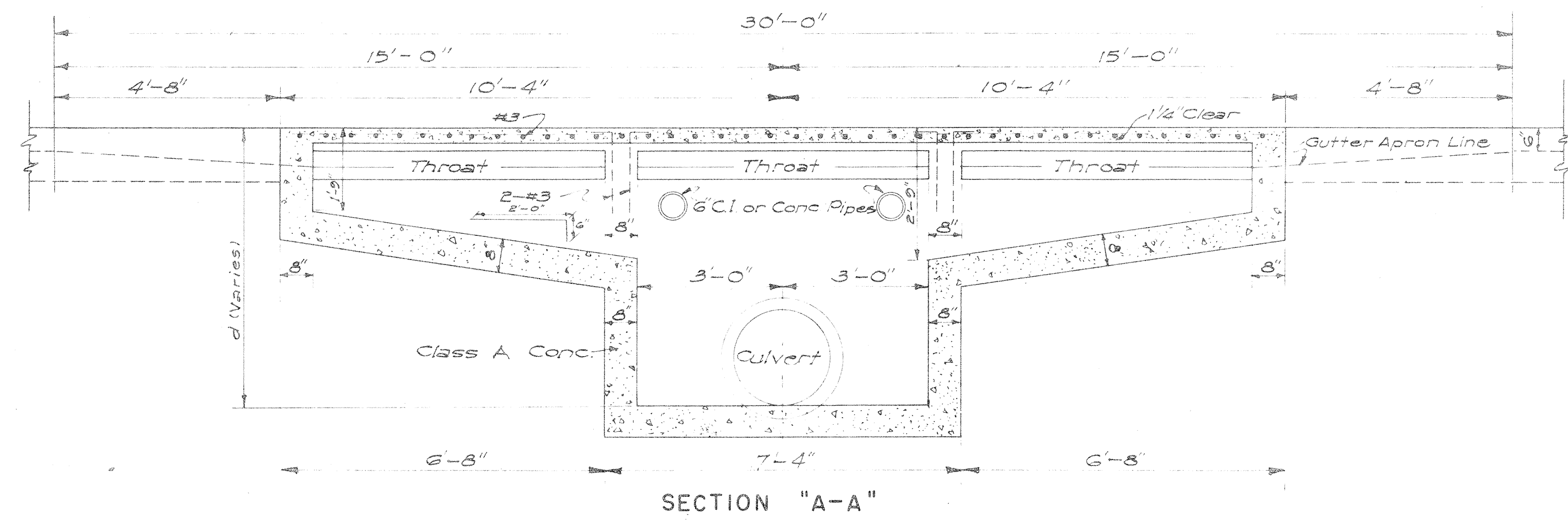


2/17/59

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1974	49	100



DETAILS OF TYPES "A", "B", "C" AND "D" CATCH BASINS
SCALE: 1/2" = 1'-0"

GENERAL NOTES

1. Quantities based on d = 5.75' and D = 30'.
2. Quantities do not include concrete for Gutter Apron.
3. The Contractor shall install two 6" Cast Iron or Concrete Pipes as incidental to Class A Concrete for Construction Drainage. The Engineer shall determine the exact location in the field.
4. Culvert shall leave C.B. from any position and any direction indicated by plans or ordered by the Engineer. Culvert may both enter and leave C.B. so that C.B. will also act as Manhole.
5. The Contractor shall install Galvanized Steel Pipe Sleeves and Straps as incidental to Sprinkler System.
6. The type of curb and/or gutter (Type 1, 2, 3, etc.) shall conform to the type specified on the roadway plans.
7. Manhole Rungs (16" o.c.) are required when "H" is greater than 4 feet 6 inches. Only one rung (12 inches from the bottom) is required if "H" is 4 feet 6 inches or less. Type "B" Cast Iron Frame and Cover and Manhole Rungs may be placed at any location as ordered by the Engineer.

ESTIMATED QUANTITIES

Type	Class A Conc. Struct. Exc.	Reinf. Steel	Gutter Length
"A"	7.5 c.y.	24.7 c.y.	145 lb.
"B"	6.0 c.y.	21.5 c.y.	108 lb.
"C"	6.0 c.y.	21.5 c.y.	108 lb.
"D"	4.9 c.y.	16.5 c.y.	77 lb.

NO.	REVISION	APPROVED BY	DATE

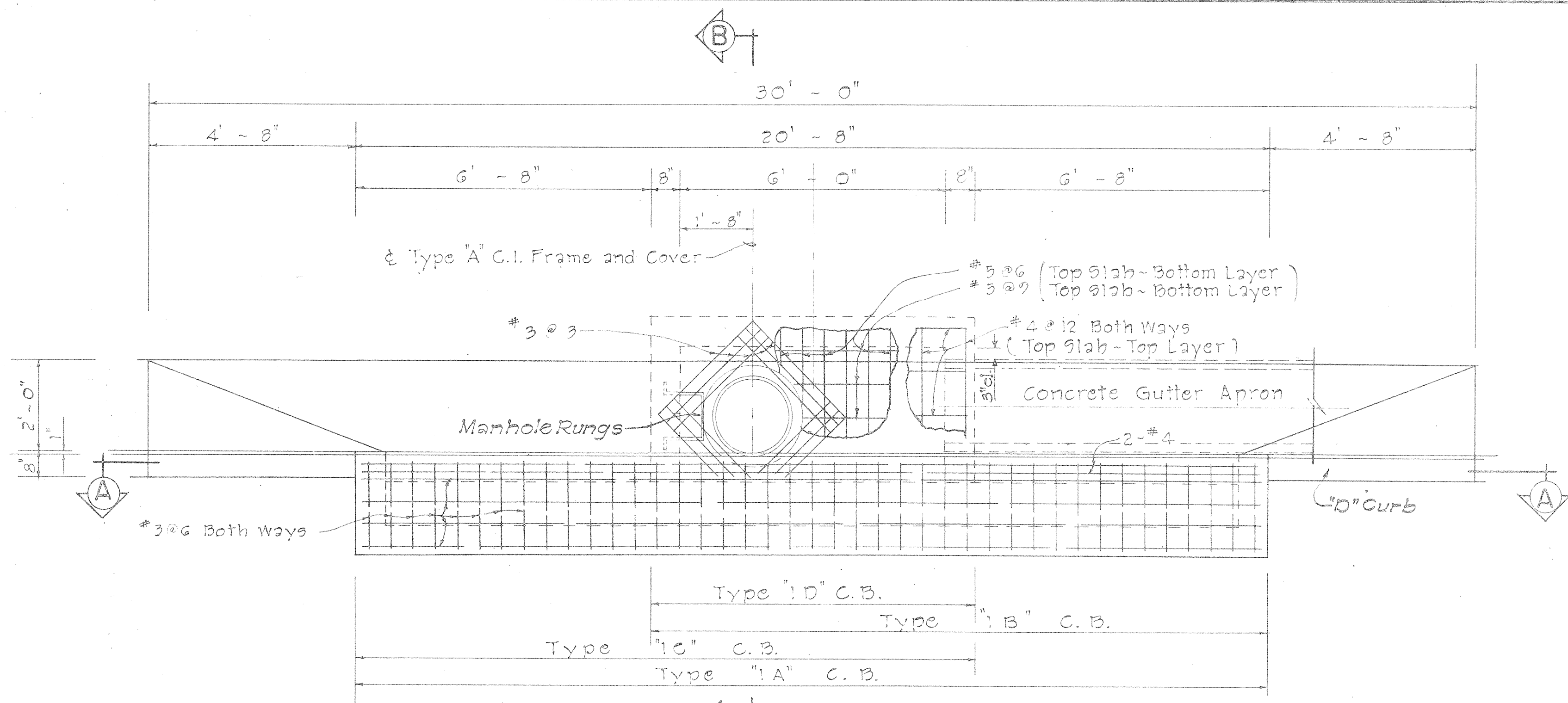
APPROVAL RECOMMENDED:
[Signature] 12-17-69
HYDRAULIC DESIGN ENGINEER DATE

APPROVED:
[Signature] 12-17-69
ASSISTANT CHIEF, ENGINEERING DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
CATCH BASINS

Scale: As Noted Date: July, 1969
SHEET NO. 1 OF 8 SHEETS

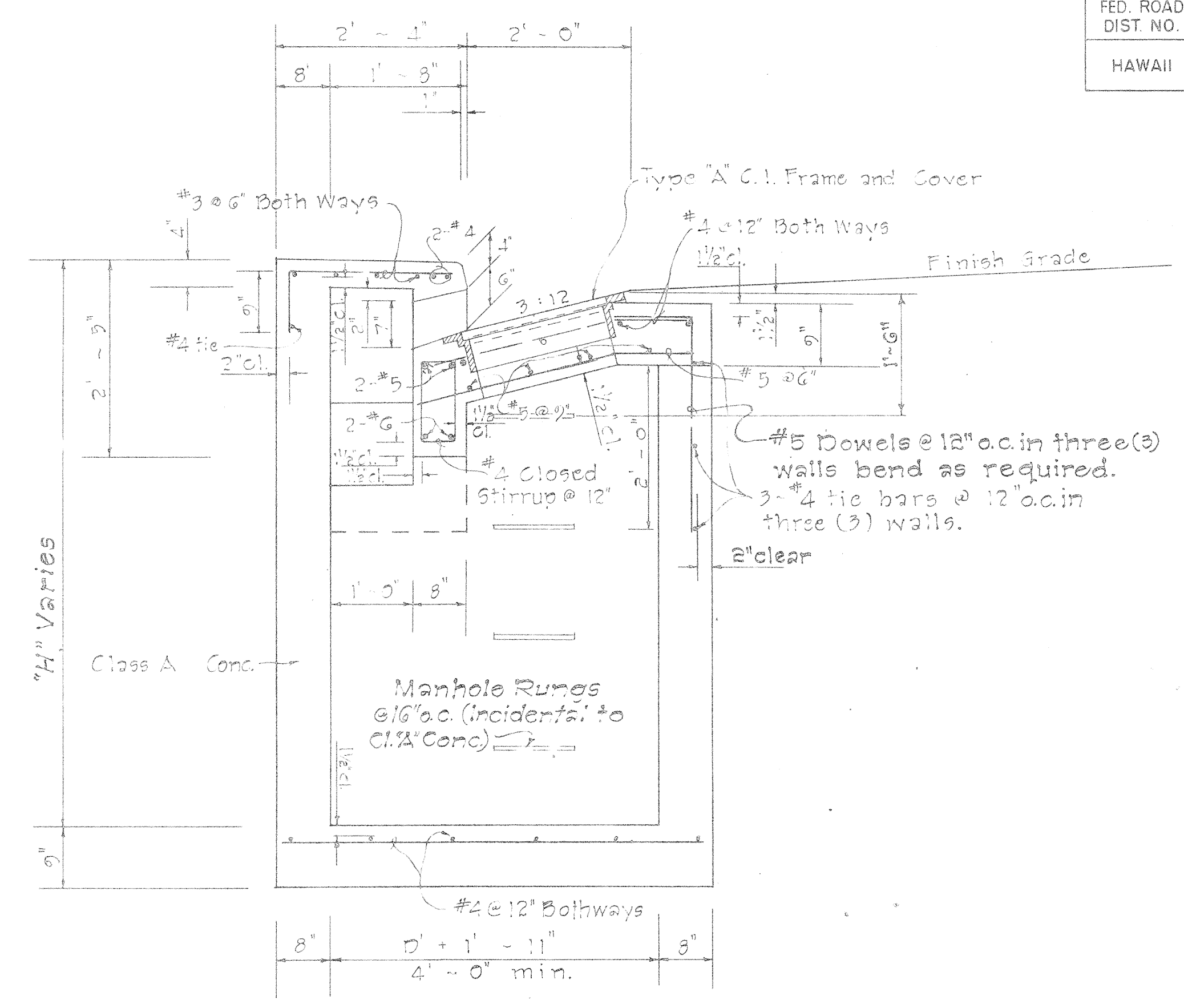
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1974	50	100



PLAN

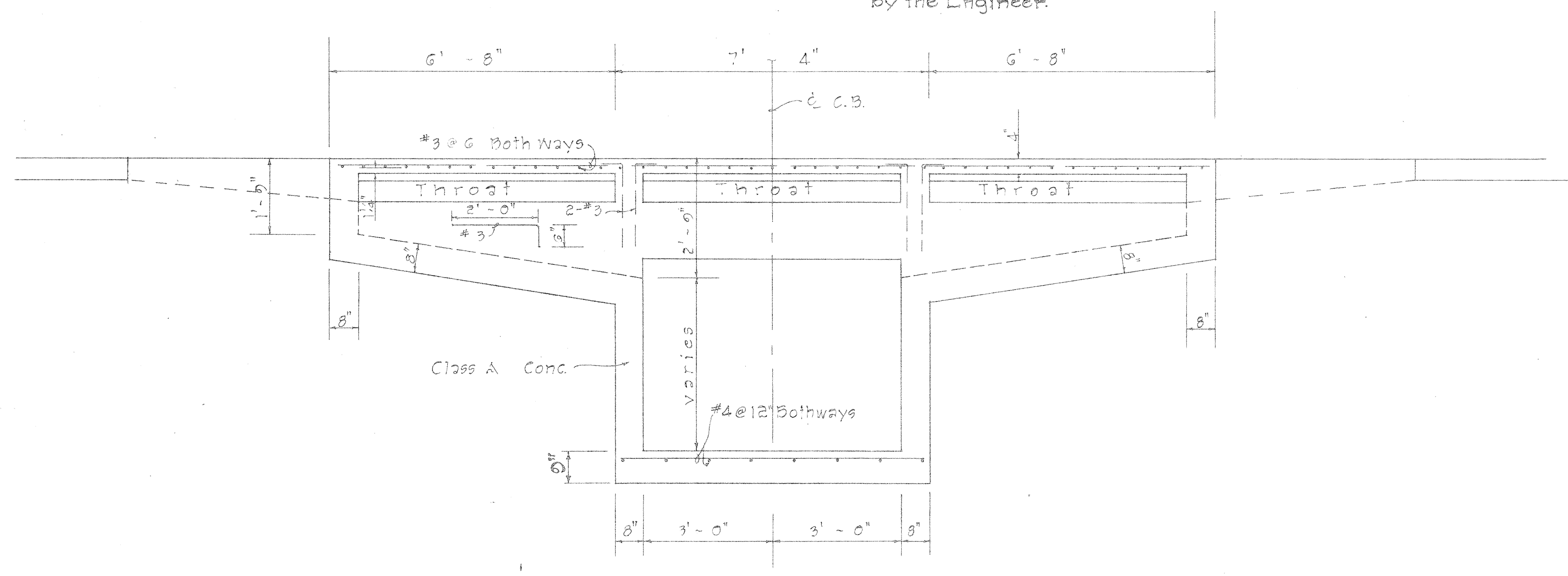
Scale: 1/2" = 1'-0"

- GENERAL NOTES**
- Culvert shall enter and leave C.B. from any position and in the direction indicated by the plans or ordered by the Engineer.
 - D shall be the maximum outside dimension of the culvert at the C.B. wall.
 - The type of curb and/or gutter (Type 1, 2, 3, etc.) shall conform to the type specified on the roadway plans.
 - Manhole Rungs (16" o.c.) are required when "H" is greater than 4 feet 6 inches. Only one rung (12 inches from the bottom) is required if "H" is 4 feet 6 inches or less. Type "A" C.I. Frame & Cover and Manhole Rungs may be placed at any location as ordered by the Engineer.



SECTION "B-B"

Scale: 3/4" = 1'-0"



SECTION "A-A"

Scale: 1/2" = 1'-0"

DETAILS OF TYPE "IA", "IB", "IC" AND "ID" CATCH BASIN

APPROVAL RECOMMENDED:
 HYDRAULIC DESIGN ENGINEER 12-17-69
 DATE

APPROVED:
 ASSISTANT CHIEF, ENGINEERING 12-17-69
 DATE

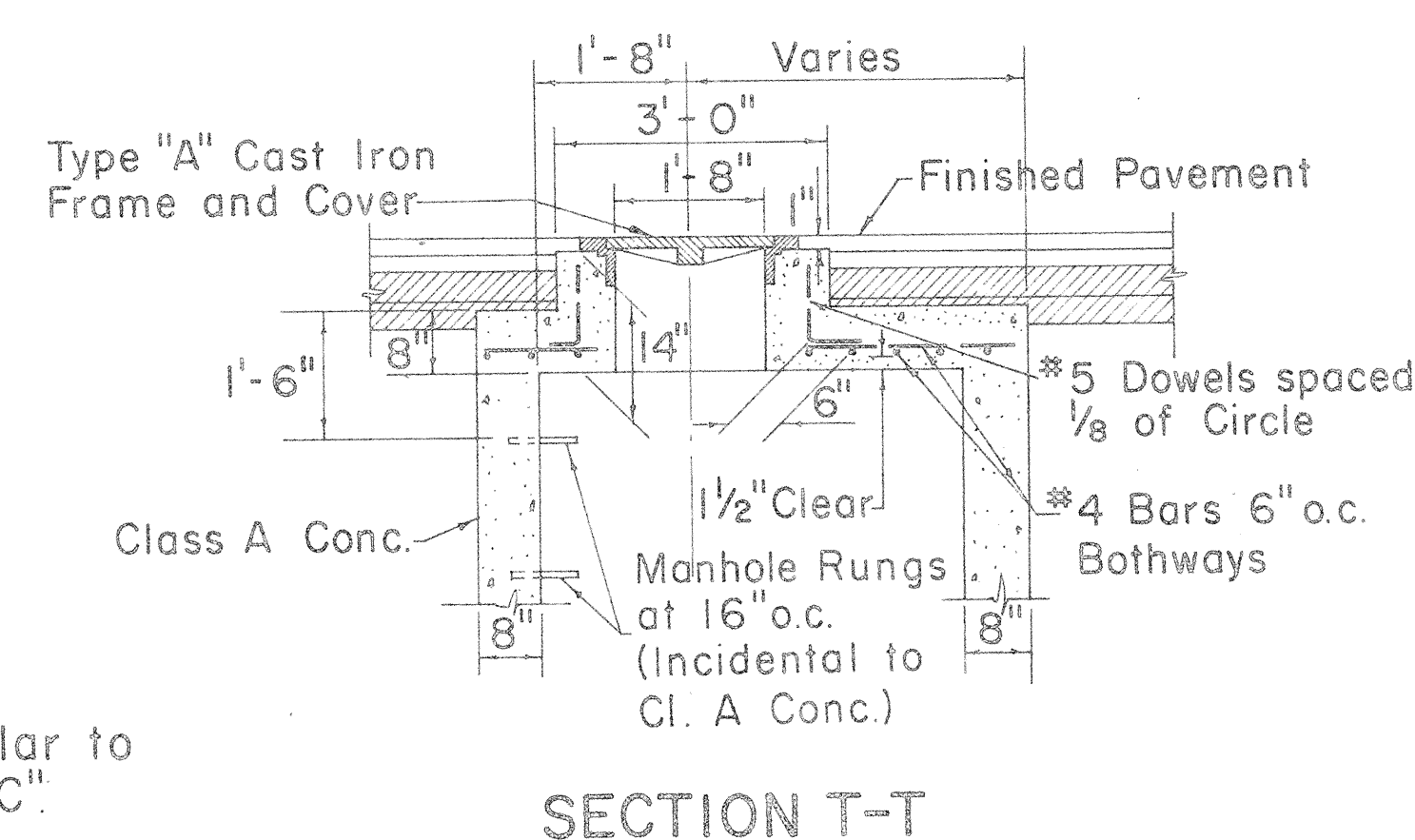
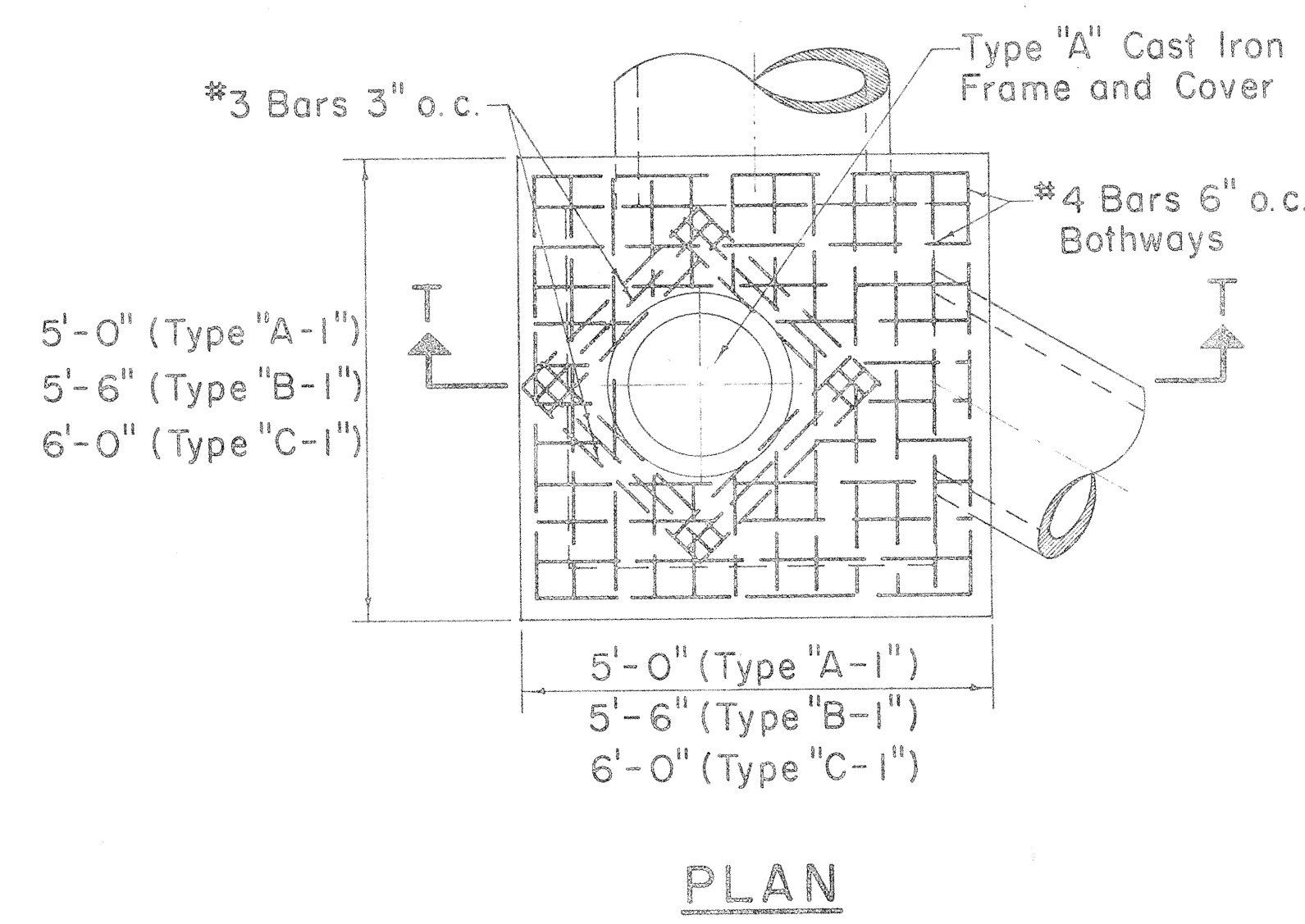
NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
 DEPARTMENT OF TRANSPORTATION
 HIGHWAYS DIVISION

STANDARD DETAILS
 TYPE "IA", "IB", "IC", AND "ID"
 CATCH BASINS

Scale: As Noted Date: July, 1969

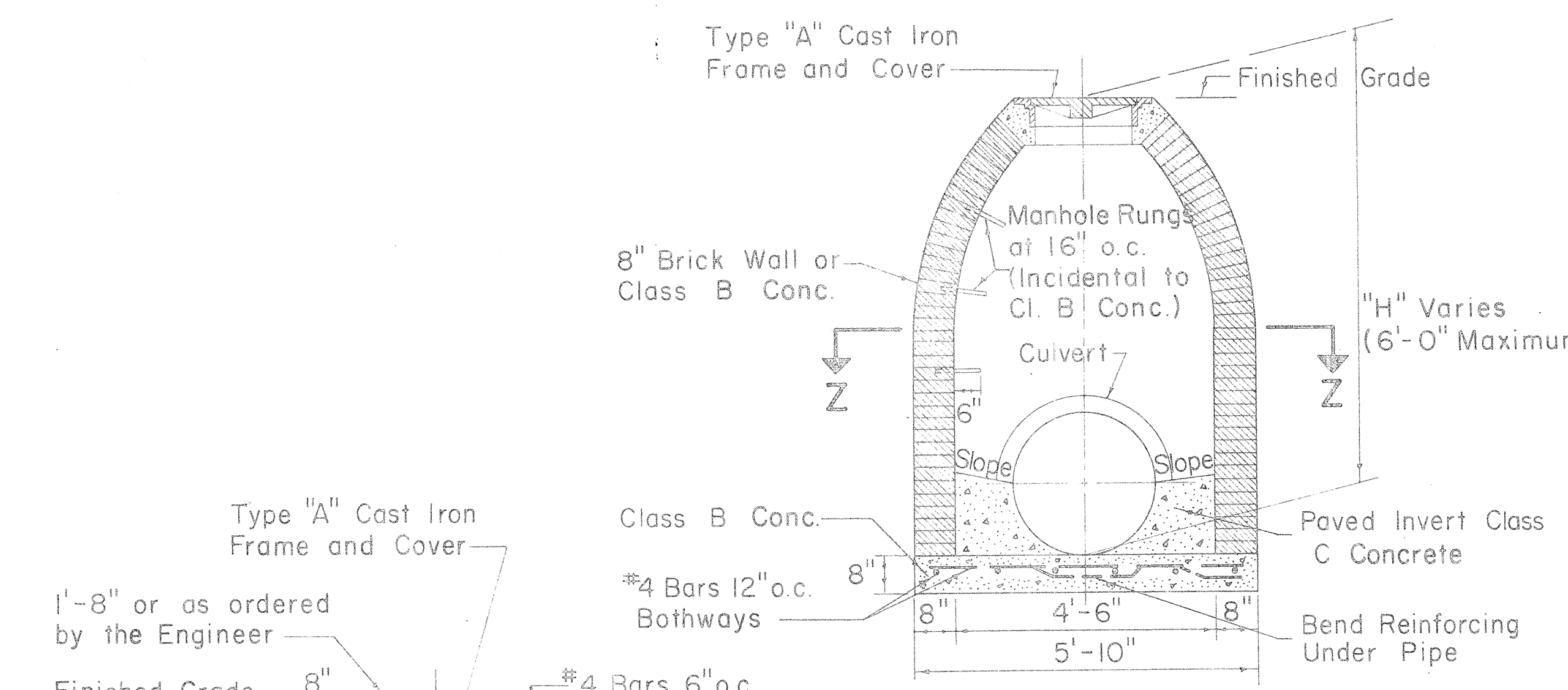
FED. ROAD DIST. NO.	STATE	FED. AID PROJECT	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAWAII		1974	51	100



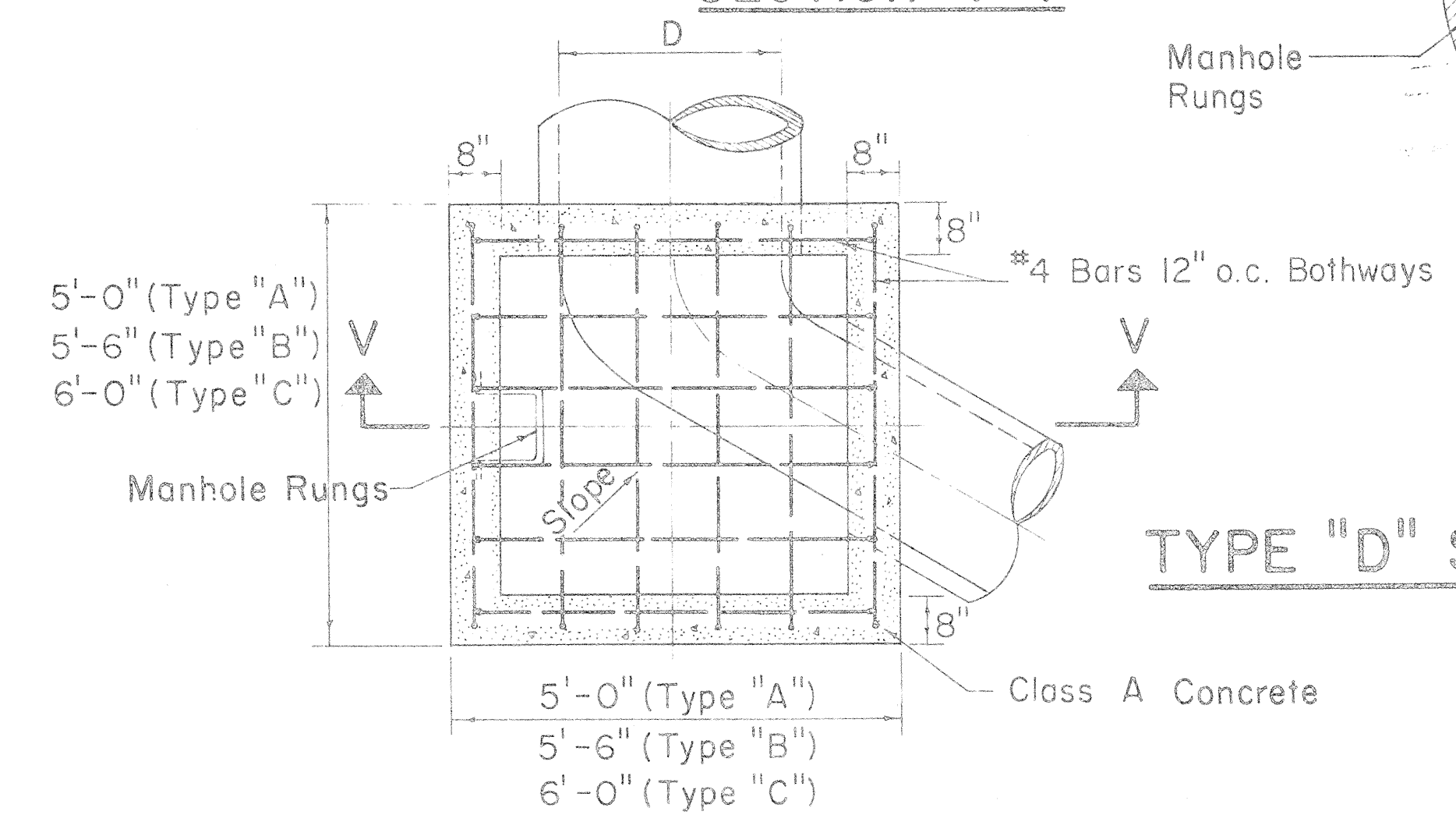
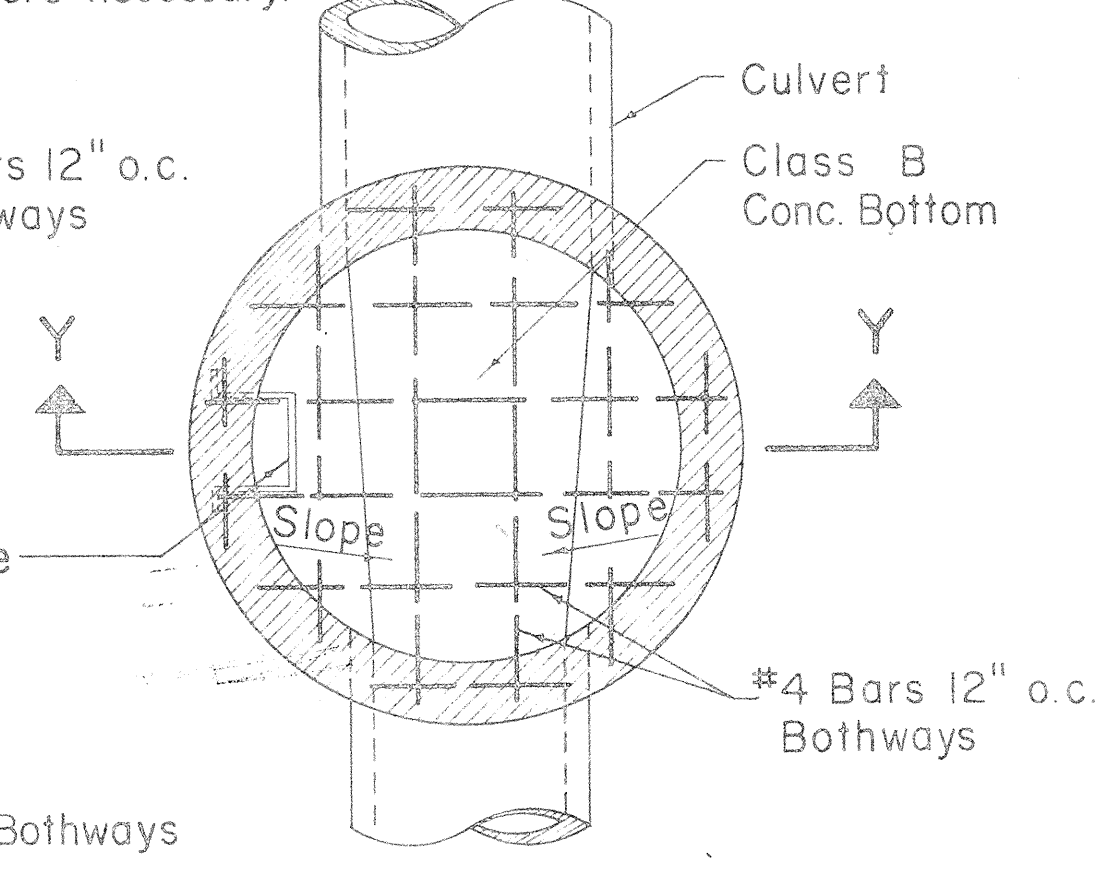
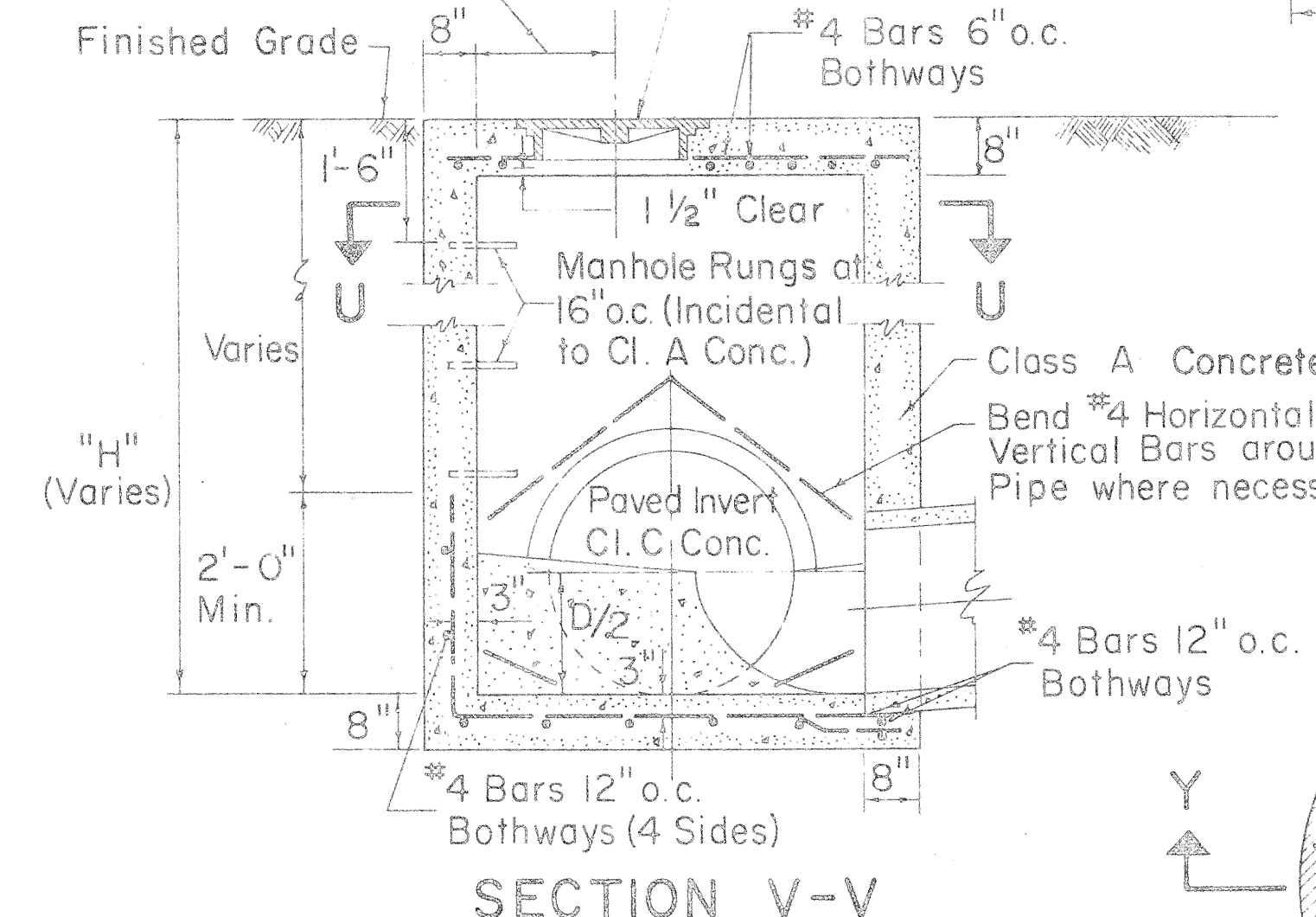
Note:
Bottom detail similar to Type "A", "B", & "C".

TYPE "A-1", "B-1", & "C-1"
STORM DRAIN MANHOLE
TOP DETAIL UNDER PAVEMENT
Scale: 1/2" = 1'-0"

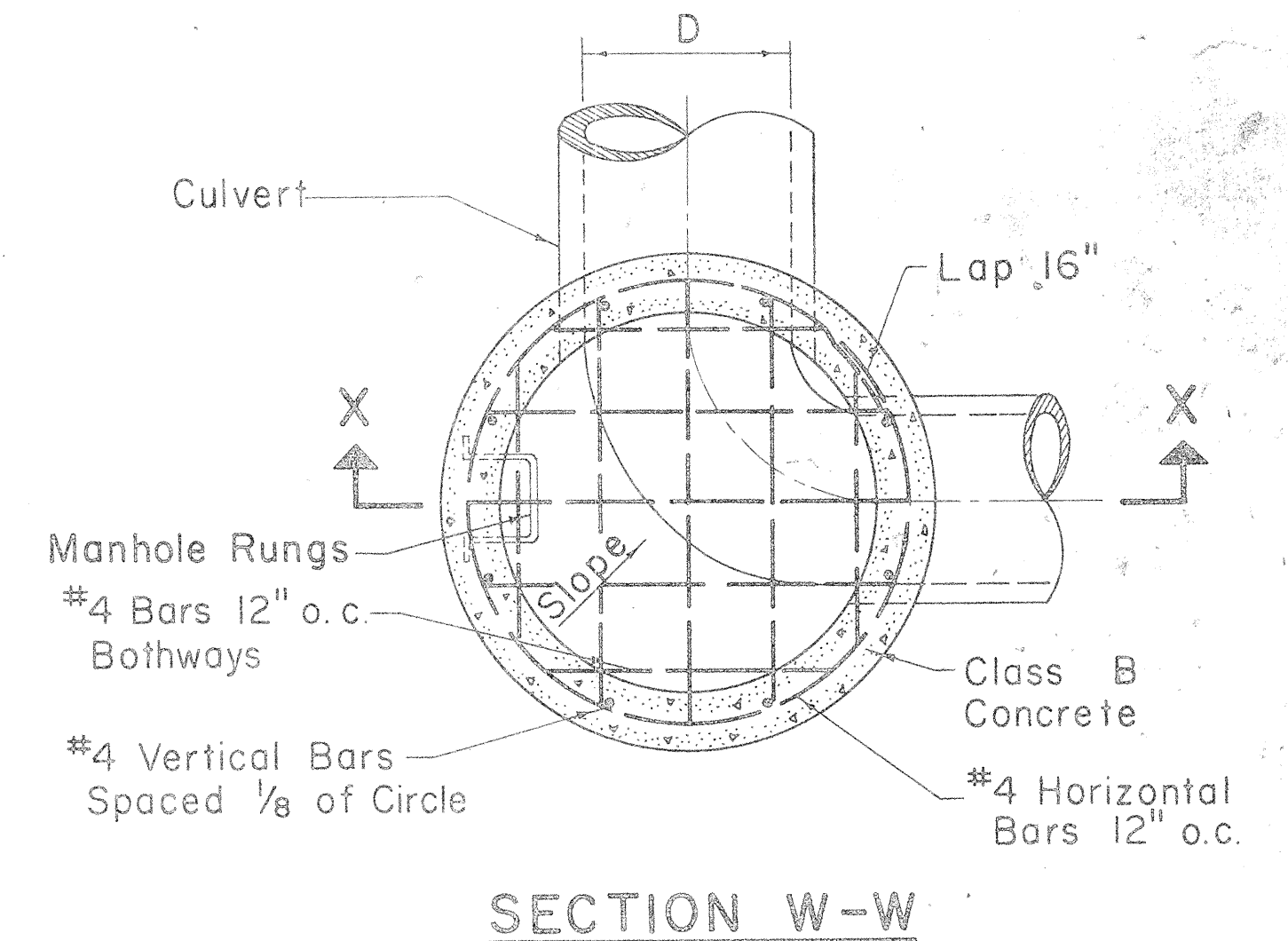
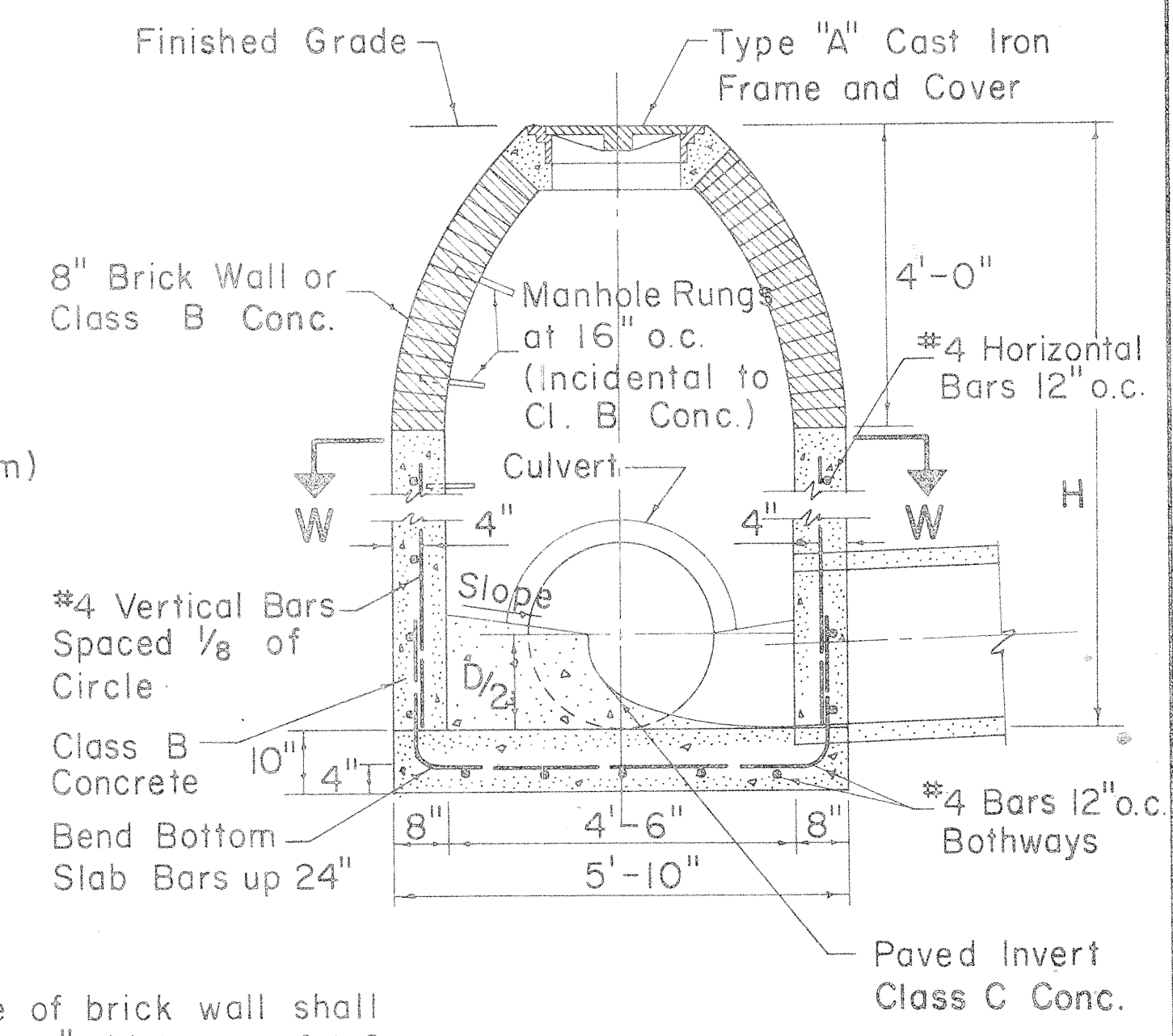
- GENERAL NOTES
- Culvert shall enter and leave S.D.M.H. from any position and in the direction indicated by the plans or ordered by the Engineer.
 - Manhole Rungs (16" o.c.) are required when "H" is greater than 4'-6". Only one rung (12" from the bottom) is required if "H" is 4'-6" or less. Type "A" C.I. Frame and Cover and Manhole Rungs may be placed at any location as ordered by the Engineer.



- NOTE:
- Exterior surface of brick wall shall be plastered with 1" thickness of 1:2 Cement Mortar.
 - Number, size and direction of culvert at manhole to be as shown on plans.
 - Paved invert not required at drop manholes.
 - All Class C Concrete to be incidental to Class B Concrete.



SECTION U-U
TYPE "A", "B", & "C"
S.D.M.H.
Scale: 1/2" = 1'-0"



SECTION W-W
TYPE "E" STORM DRAIN MANHOLE
Scale: 1/2" = 1'-0"

TYPE "D" STORM DRAIN MANHOLE
Scale: 1/2" = 1'-0"

APPROVAL RECOMMENDED:
P. Palans 12-17-69
HYDRAULIC DESIGN ENGINEER DATE

APPROVED:
Shirley S. S. S. 12-17-69
ASST. CHIEF, ENGINEERING DATE

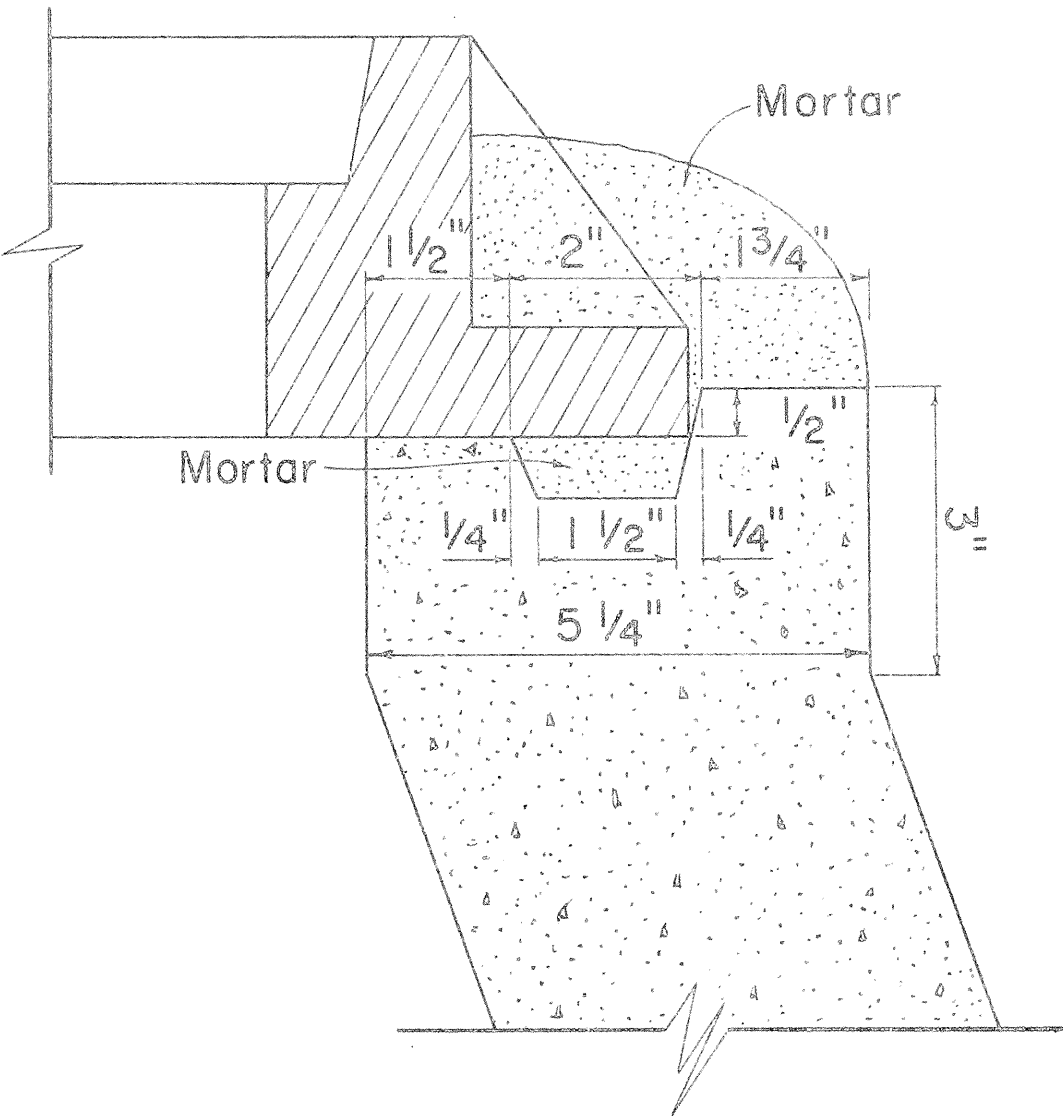
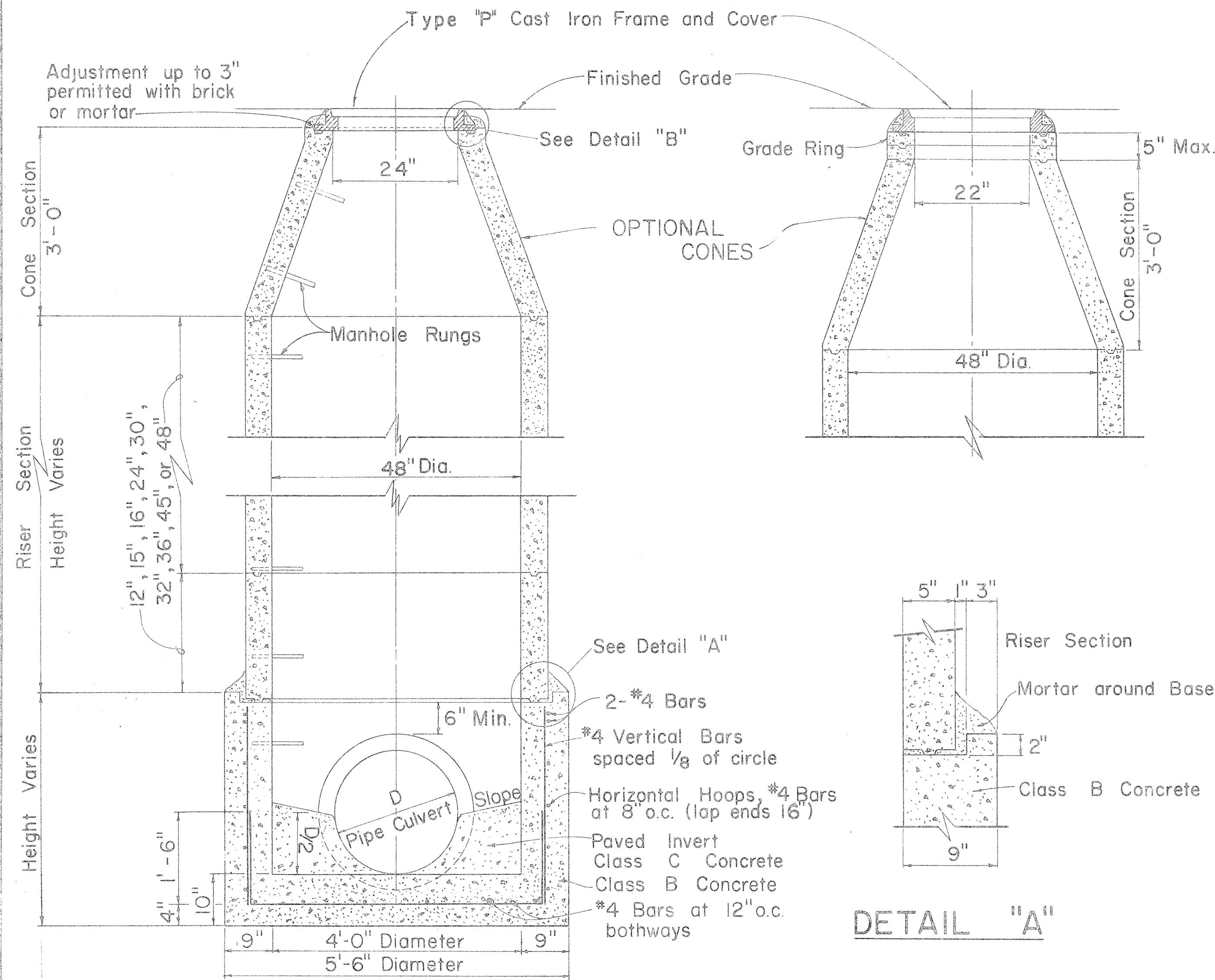
NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION

STANDARD DETAILS
STORM DRAIN MANHOLES

Scales: As Noted Date: July, 1969

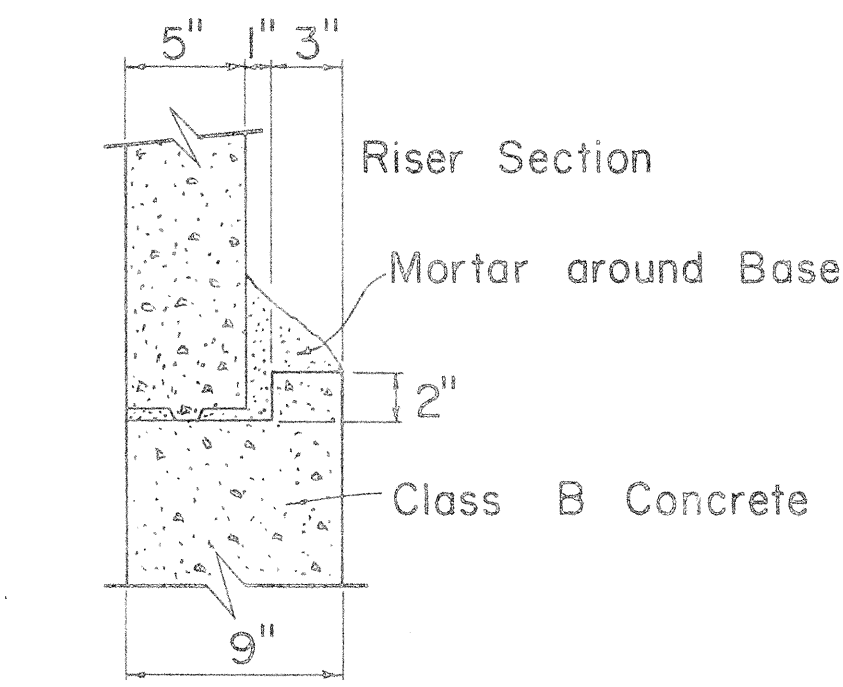
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1974	52	100



DETAIL "B"
Not to Scale

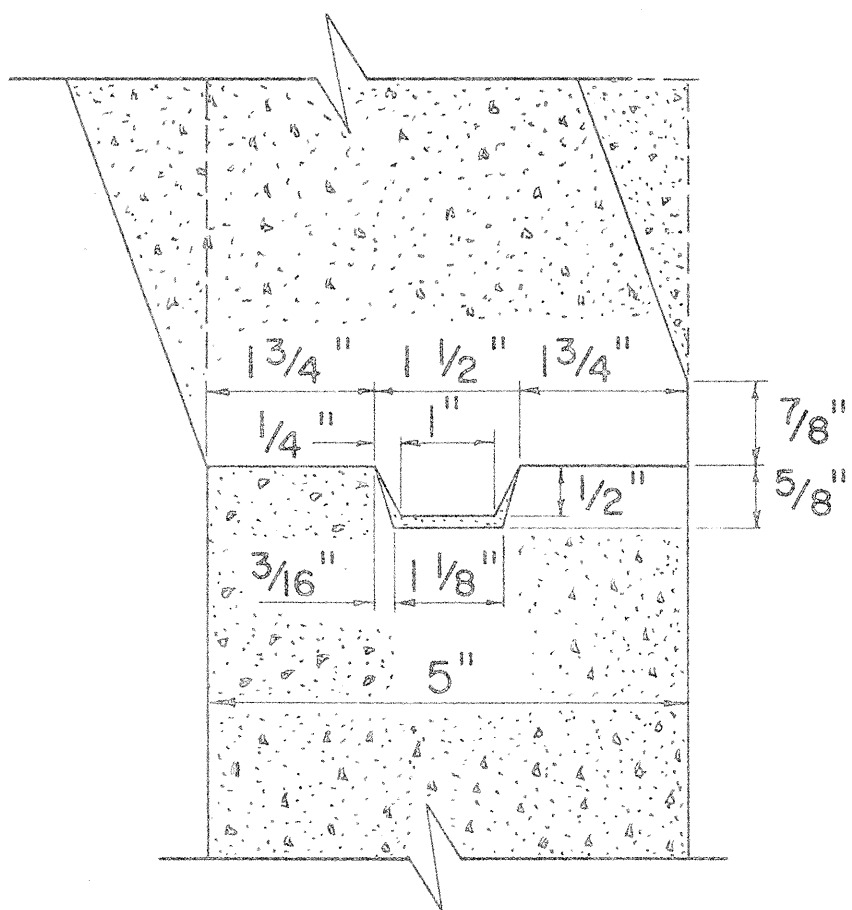
GENERAL NOTES

1. Manhole Rungs to be placed at 15" or 16" o.c. (Manhole Rungs incidental to Class B Concrete.) For detail of M.H. rungs see sheet DH-6
2. Select appropriate combination of risers and grade rings for required height.
3. All joints to be grouted as set.
4. The precast sections shall be constructed in accordance with the details shown on the plans and to the requirements of ASTM C 478
5. Manufacturers may submit to the Engineer for approval, prior to manufacturing, designs other than those shown on this sheet.
6. Reinforcing steel for precast sections shall be placed in accordance with the requirements of ASTM C 478
7. All Class C Concrete to be incidental to Class B Concrete.

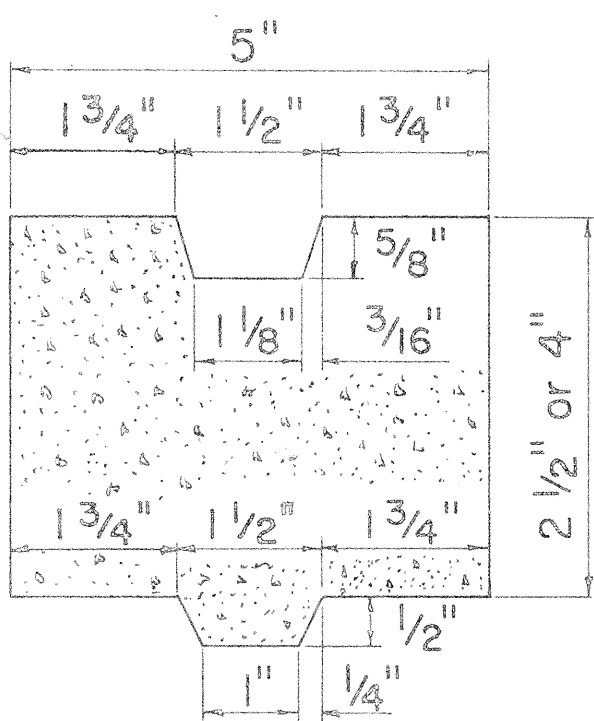


DETAIL "A"
Not to Scale

TYPICAL SECTIONS PRECAST CONCRETE MANHOLE
Not to Scale



DETAIL FOR RISER JOINTS
Not to Scale



GRADE RING DETAIL
Not to Scale

APPROVAL RECOMMENDED:
G. Nakano
HYDRAULIC DESIGN ENGINEER
DATE: 2-2-71

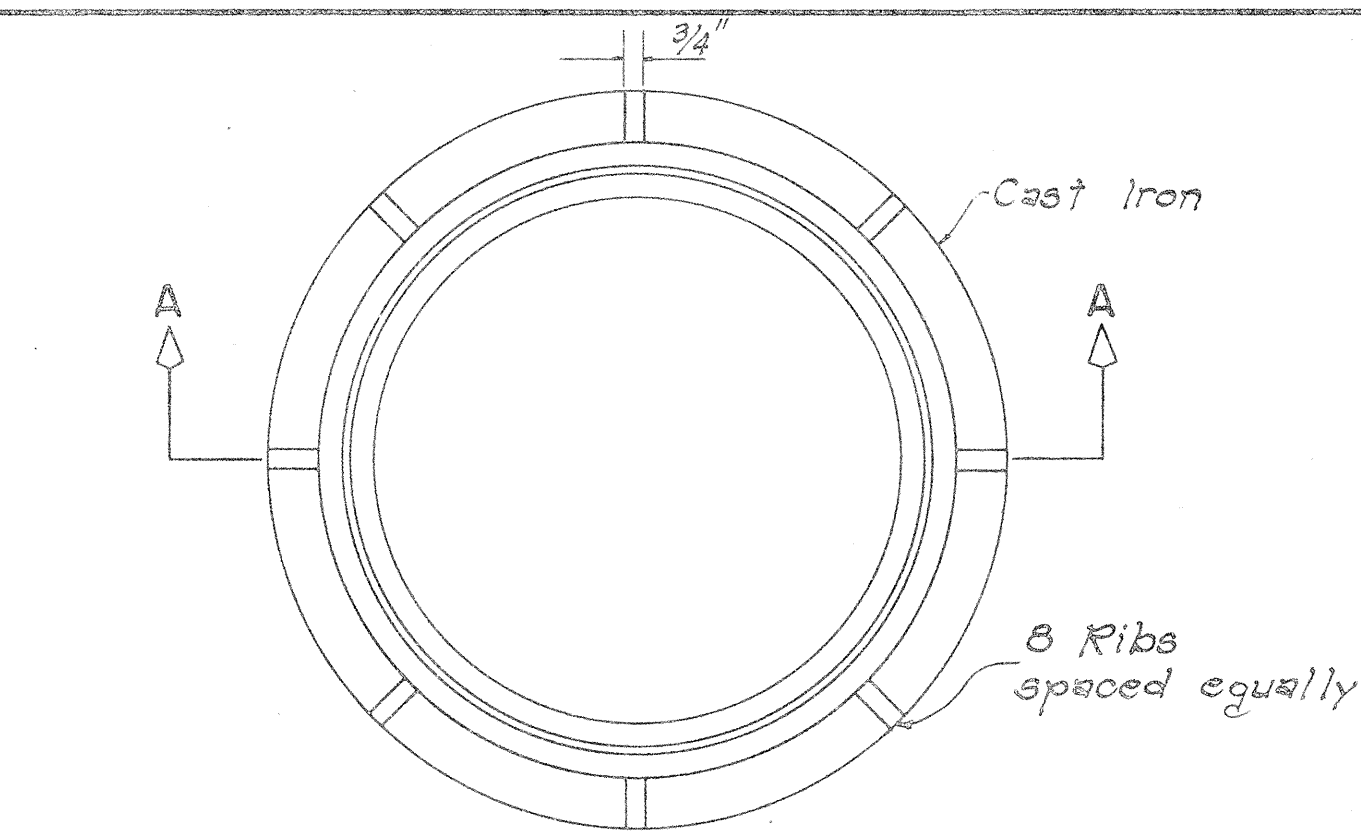
APPROVED:
A. Sakai
ASSISTANT CHIEF, ENGINEERING
DATE: 2-23-71

NO.	REVISION	APPROVED BY	DATE

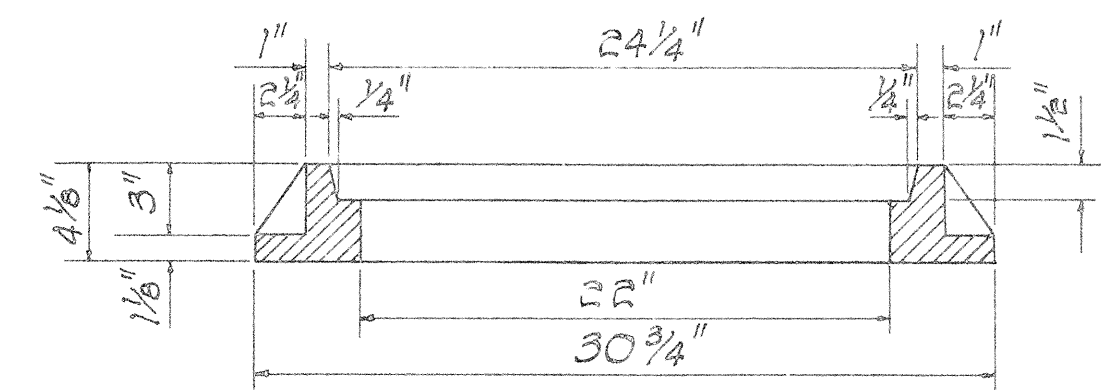
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
PRECAST CONCRETE
STORM DRAIN MANHOLES

Not to Scale
Date: Nov. ,1970
SHEET No. 4 OF 8 SHEETS
DH 5A

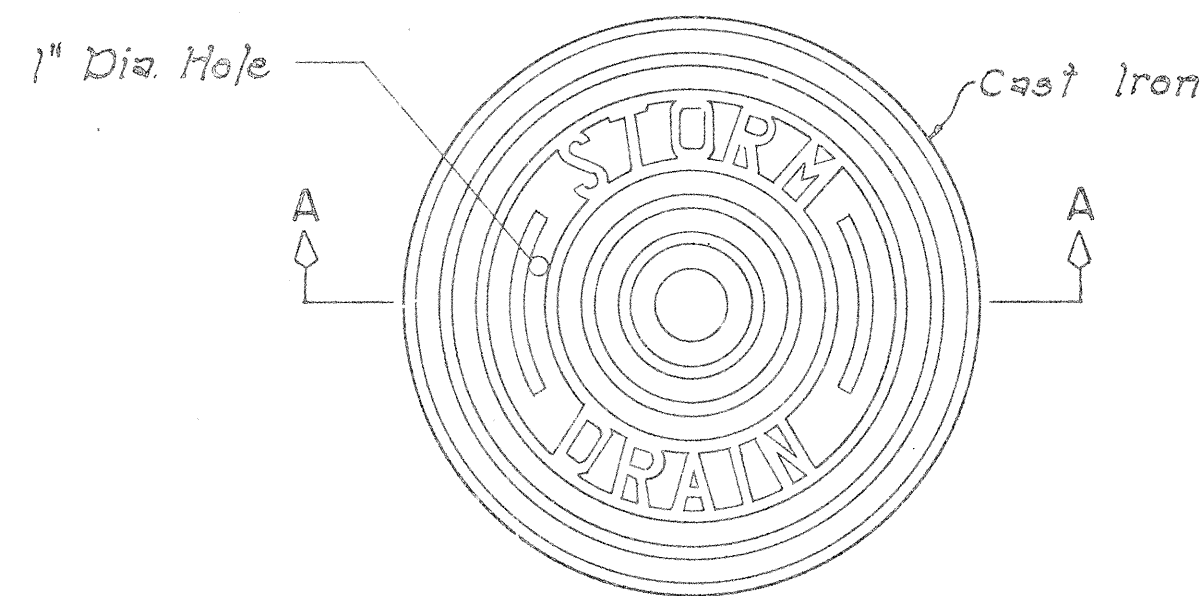
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1974	53	100



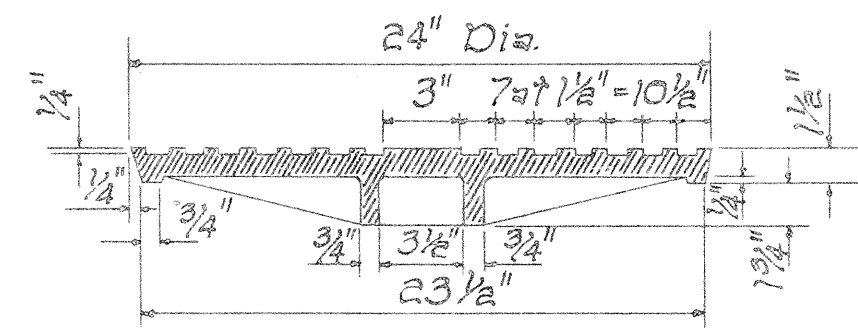
PLAN



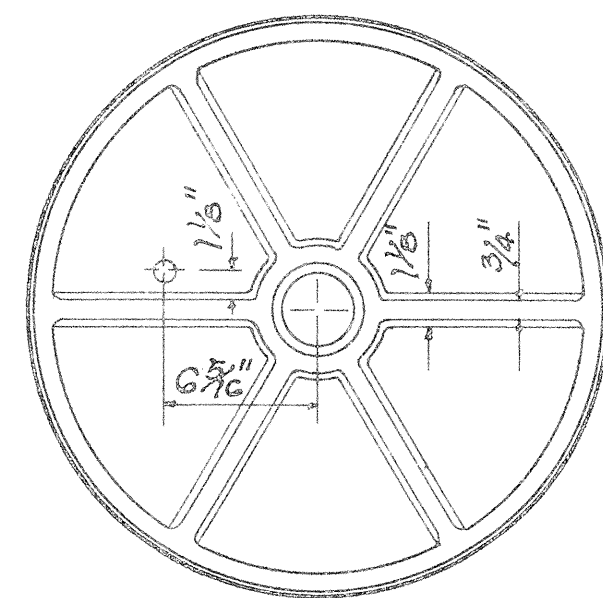
SECTION A-A



PLAN



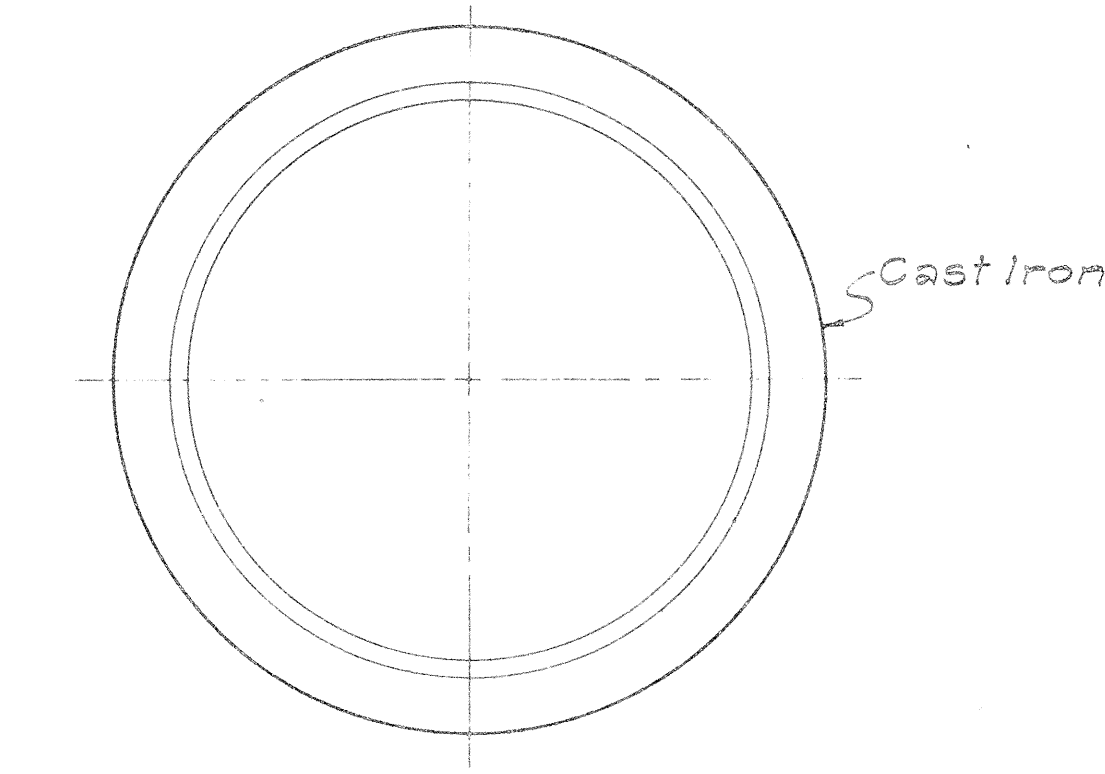
SECTION A-A



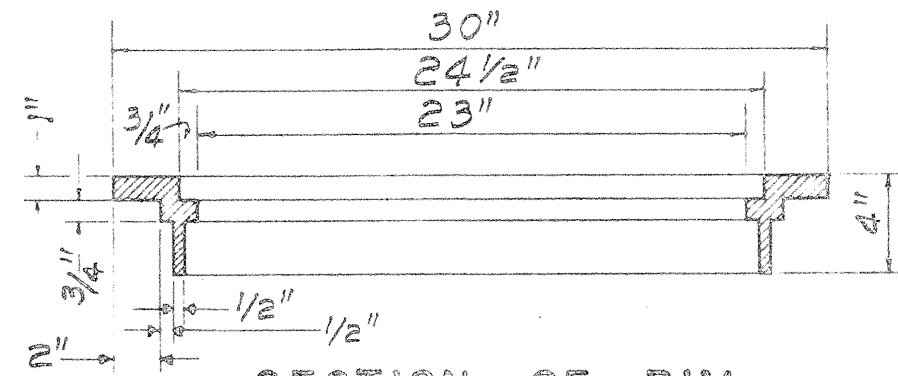
BOTTOM VIEW OF COVER

DETAILS OF TYPE "P"
CAST IRON FRAME AND COVER

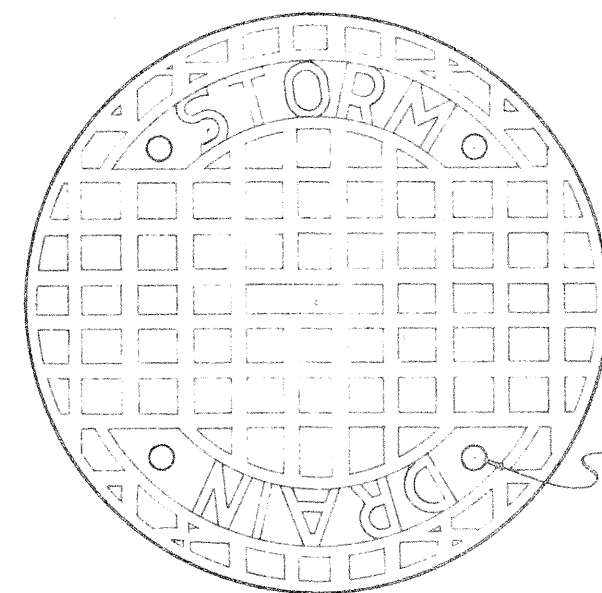
SCALE: 1-1/2" = 1'-0"



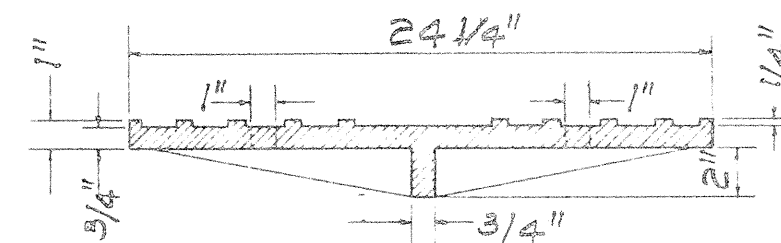
PLAN OF RIM



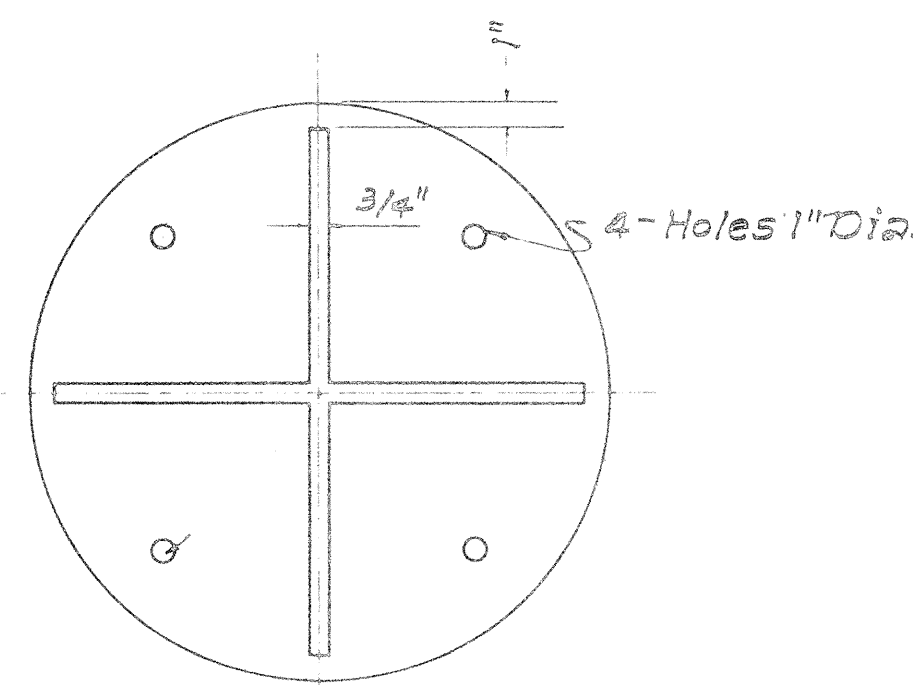
SECTION OF RIM



TOP VIEW OF COVER



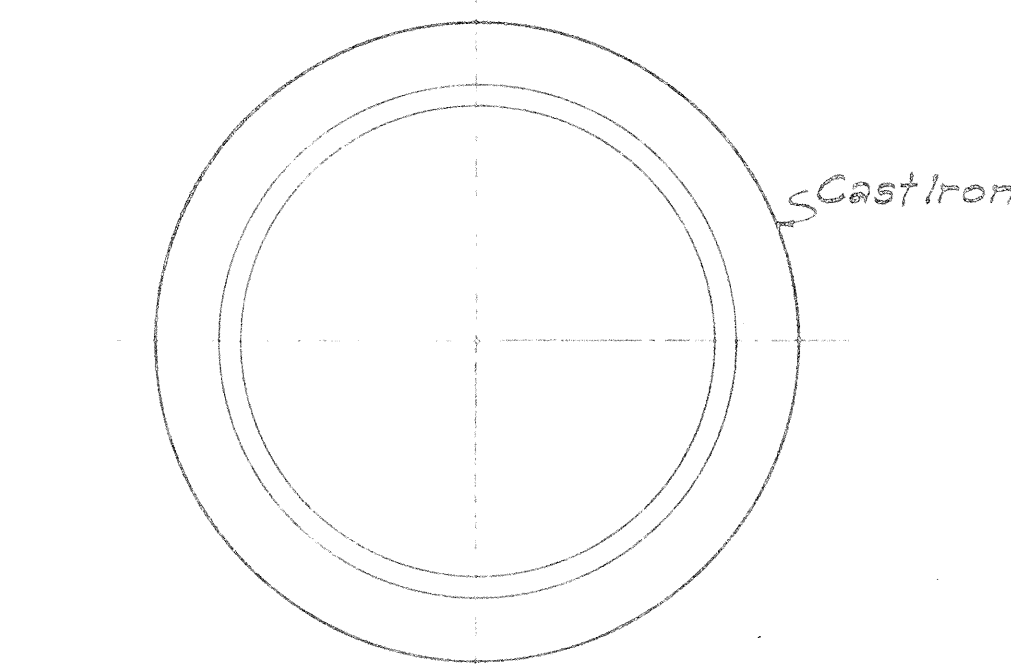
SECTION



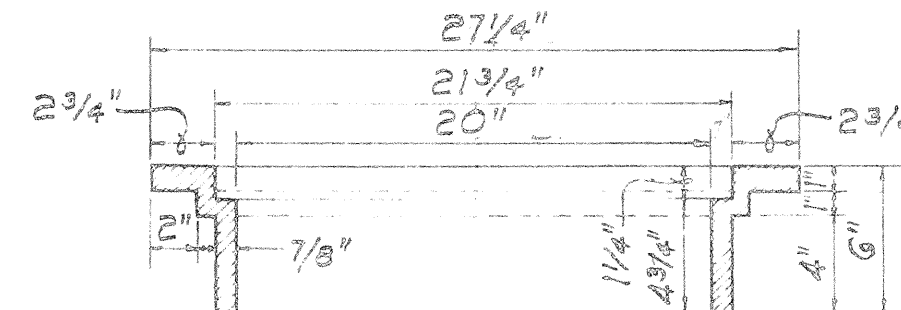
BOTTOM VIEW OF COVER

DETAILS OF TYPE "B"
CAST IRON FRAME AND COVER

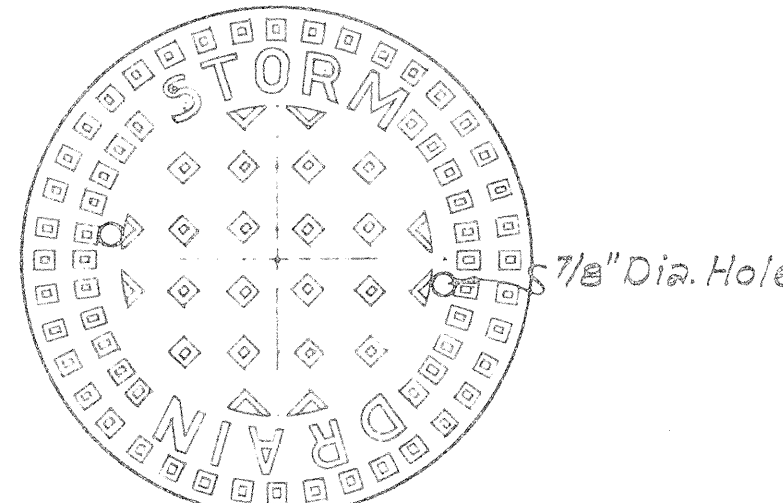
SCALE: 1-1/2" = 1'-0"



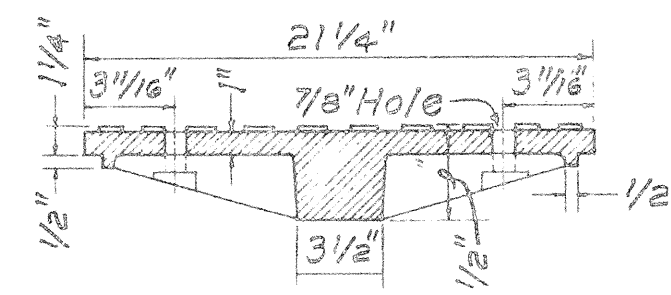
PLAN OF RIM



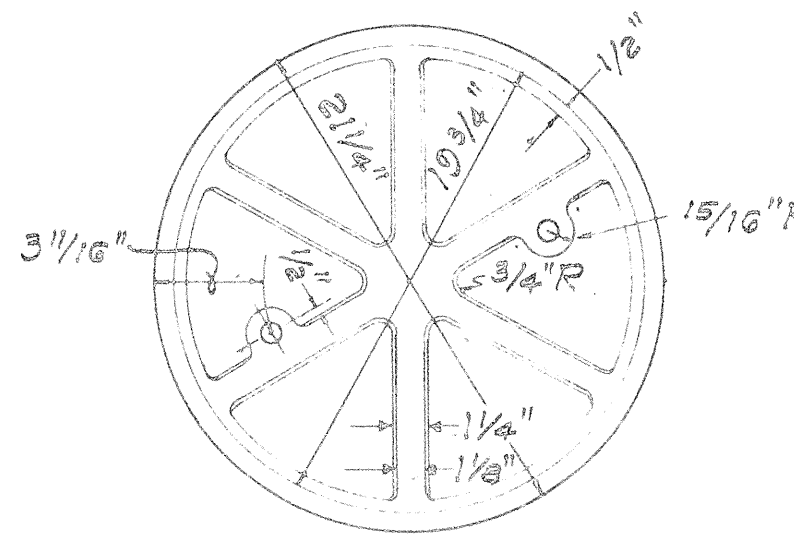
SECTION OF RIM



TOP VIEW OF COVER



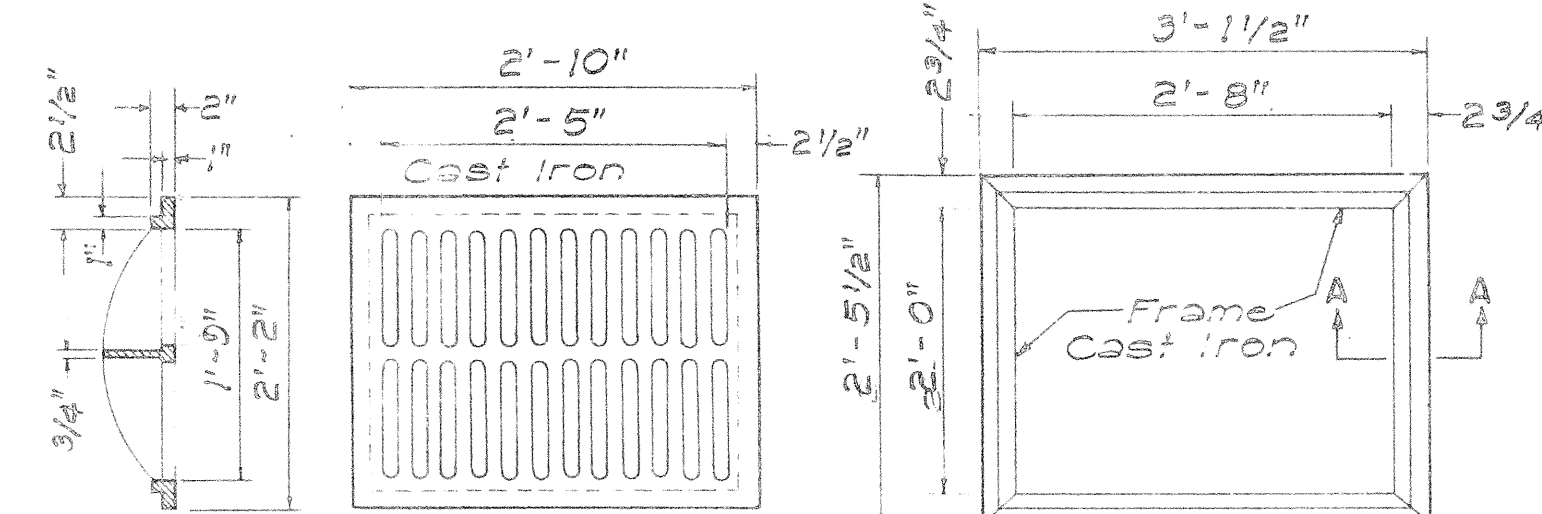
SECTION



BOTTOM VIEW OF COVER

DETAILS OF TYPE "A"
CAST IRON FRAME AND COVER

SCALE: 1-1/2" = 1'-0"



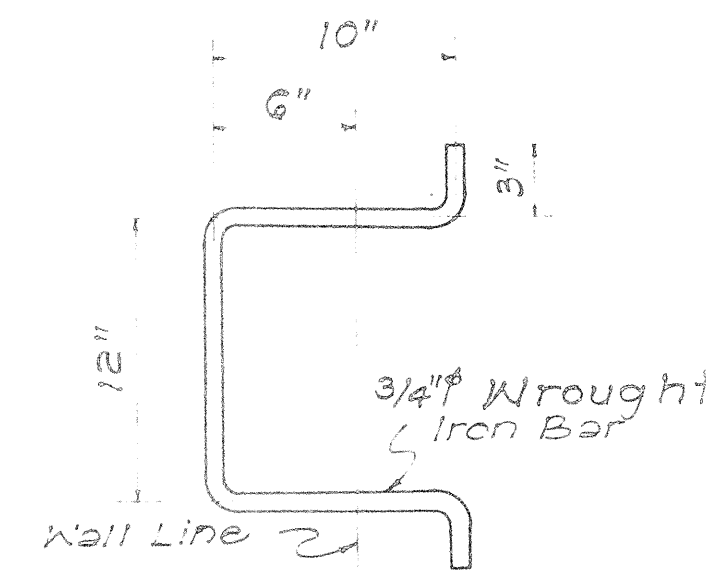
SECTION

TOP VIEW

TOP VIEW

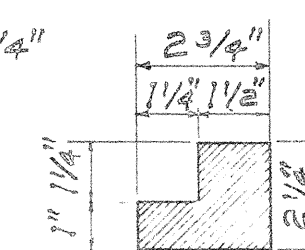
TYPE C C.I. FRAME AND GRATE

SCALE: 3/4" = 1'-0"



MANHOLE RUNG

SCALE: 1-1/2" = 1'-0"



SECTION "A-A"
SCALE 3" = 1'-0"

APPROVAL RECOMMENDED:
HYDRAULIC DESIGN ENGINEER
DATE: 12-17-69

APPROVED:
ASSISTANT CHIEF, ENGINEERING
DATE: 12-11-69

NO.	REVISION	APPROVED BY	DATE
1.	Detail of Type "P" Cast Iron Frame and Cover	H.T.	1-6-71

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
CATCH BASIN AND
MANHOLE CASTINGS
Scale: As Noted
Date: July, 1969
SHEET NO 5 OF 8 SHEETS DH 6

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1974	54	100

GENERAL NOTES

1. Grates and Frames shall be hot dip galvanized after fabrication, see specifications.
2. All welds $\frac{3}{8}$ " unless otherwise noted.
3. Refer to "Spacing Table" for Types 61614 & 61616 Drop Intake and Frame & Grates dimensions.
4. The Frame & Grate materials shall conform to the specifications of ASTM Designation Structural Steel A283, Grade D and the Standard Specifications.
5. Culvert shall leave Drop Intake from any position and any direction indicated by plans or ordered by the Engineer. Culverts may both enter and leave Drop Intake so that Drop Intake will act as manhole.
6. Manhole Rungs (16" o.c.) are required when "H" is greater than 4 feet 6 inches. Only one rung (12 inches from the bottom) is required if "H" is 4 feet 6 inches or less. Manhole Rungs may be placed at any location as ordered by the Engineer.

SPACING TABLE					
TYPE	NO. BARS	A	B	C	D
61614	11	2' - 0"	1' - 11 $\frac{1}{2}$ "	1 $\frac{1}{4}$ "	1' - 6"
61616	17	3' - 0"	2' - 11 $\frac{3}{8}$ "	1 $\frac{1}{8}$ "	2' - 0"

NO.	REVISION	APPROVED BY	DATE
1	Curb for Top of Fill Gutters	H.P.	6-5-91

APPROVAL RECOMMENDED:

S. Sakano
HYDRAULIC DESIGN ENGINEER

52-17-69
DATE

APPROVED:

2nd class 22nd
ASSISTANT CHIEF, ENGINEERING

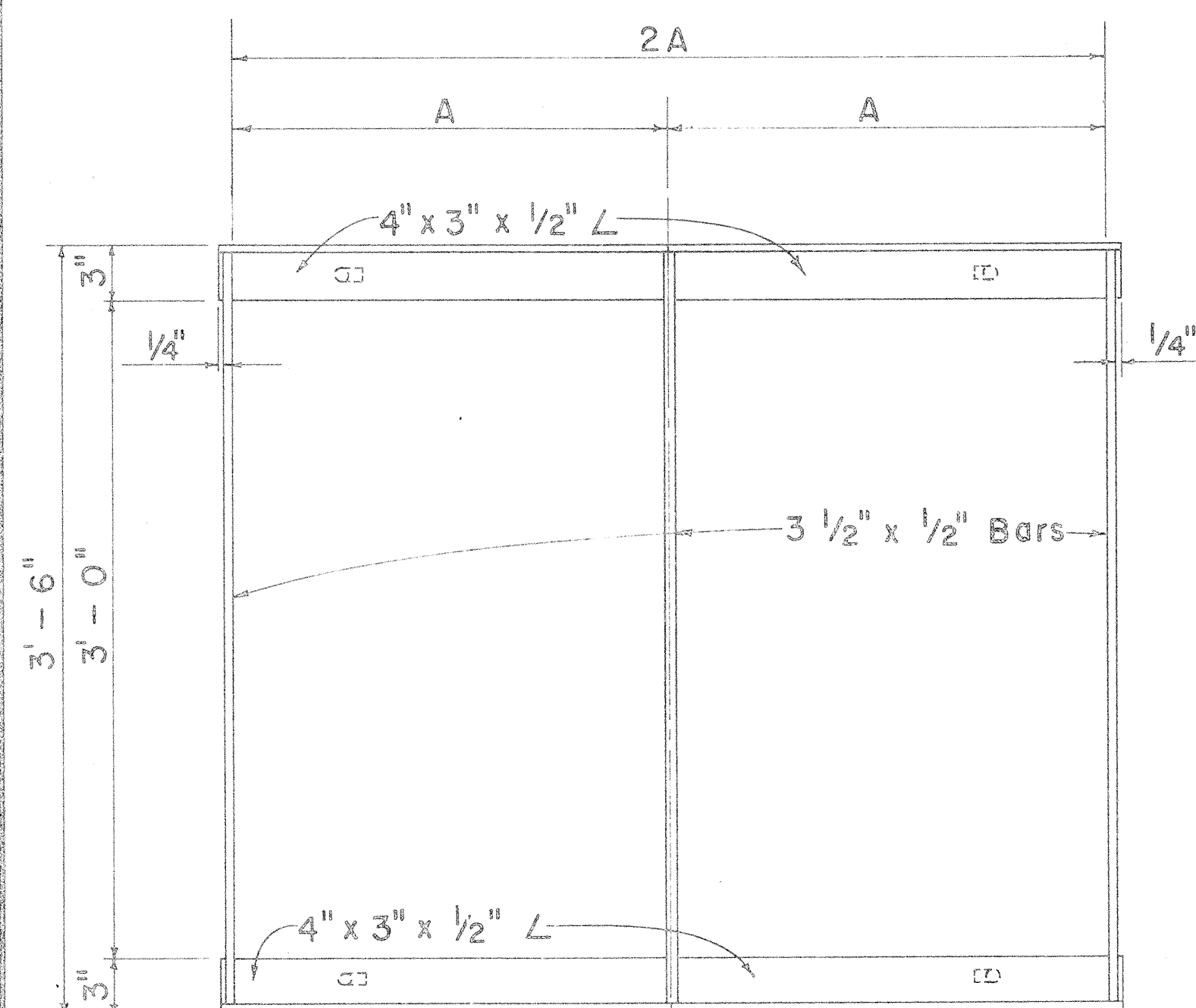
12-11-69
DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
TYPE 61614 & 61616
GRADED DROP INTAKES

Scales: As Noted

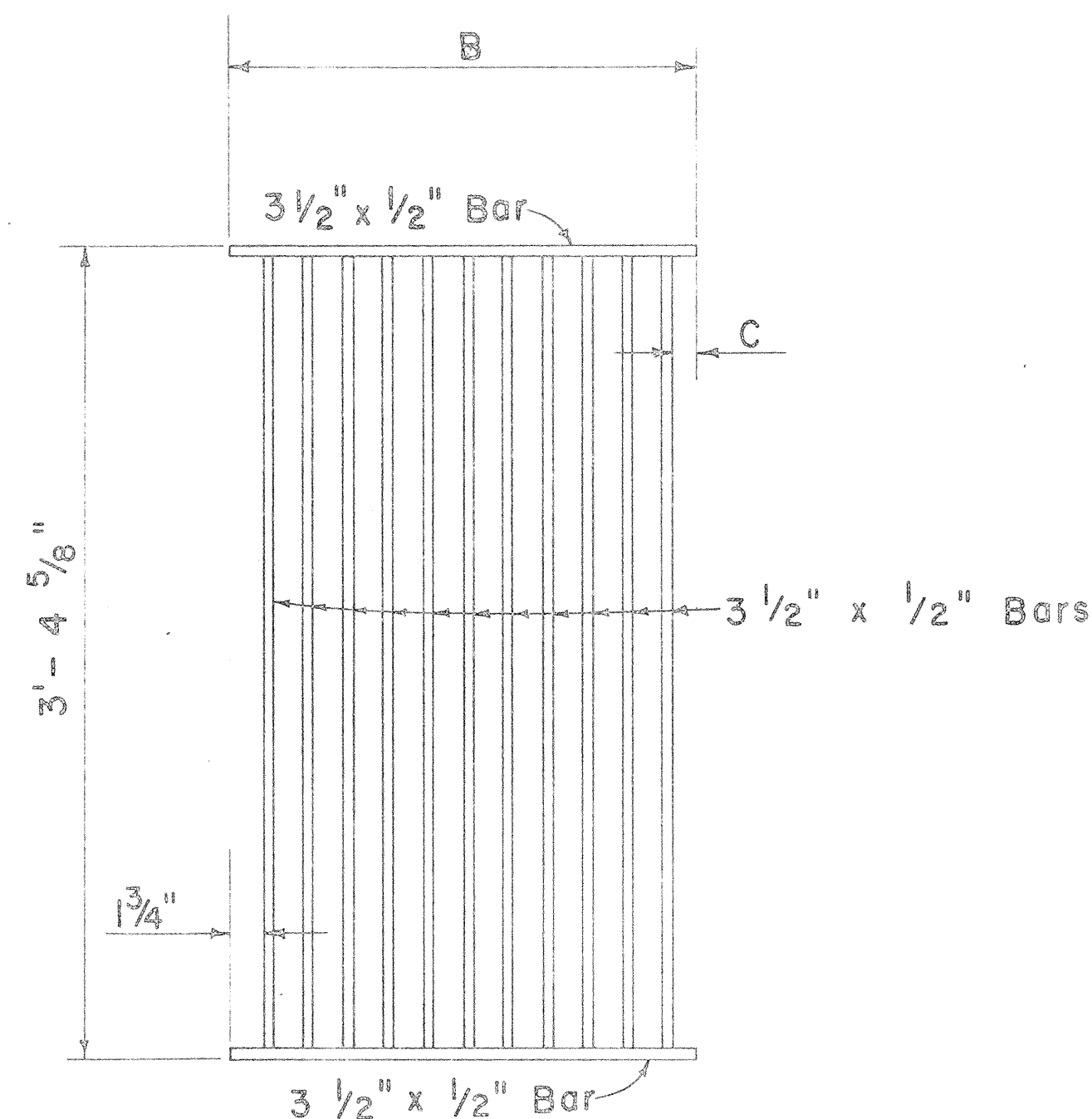
Date: Feb. 1969

SHEET No. 6 OF 8 SHEETS DH 8



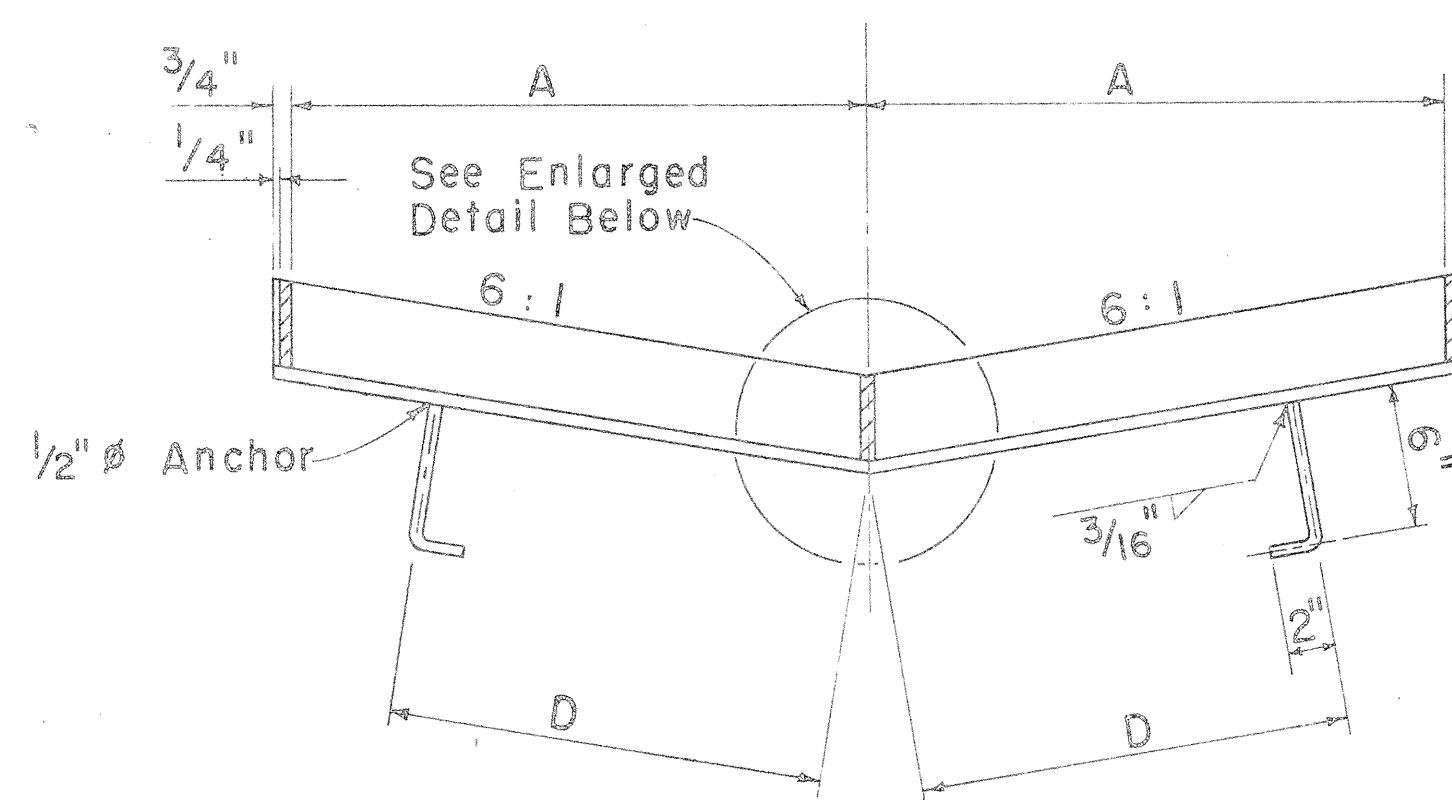
PLAN

Scale: $1\frac{1}{2}" = 1' - 0"$



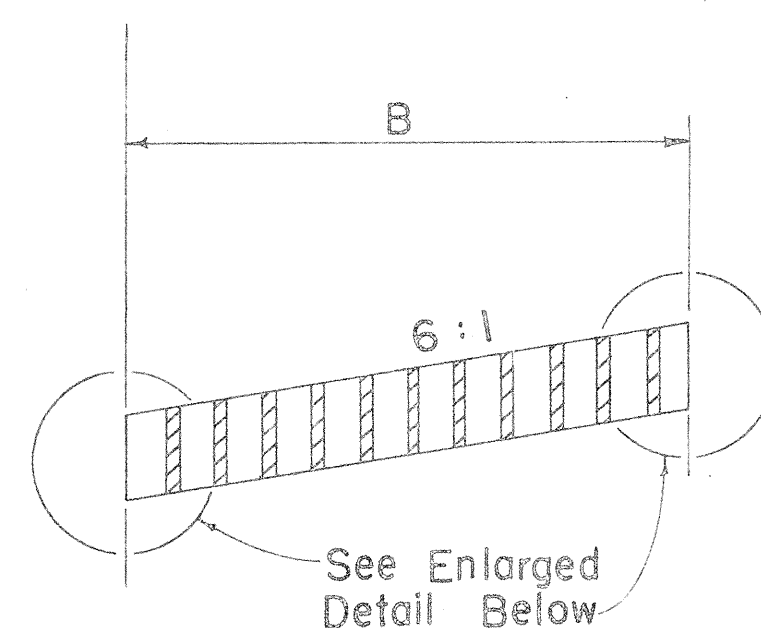
PLAN

Scale: $1\frac{1}{2}'' = 1' - 0''$



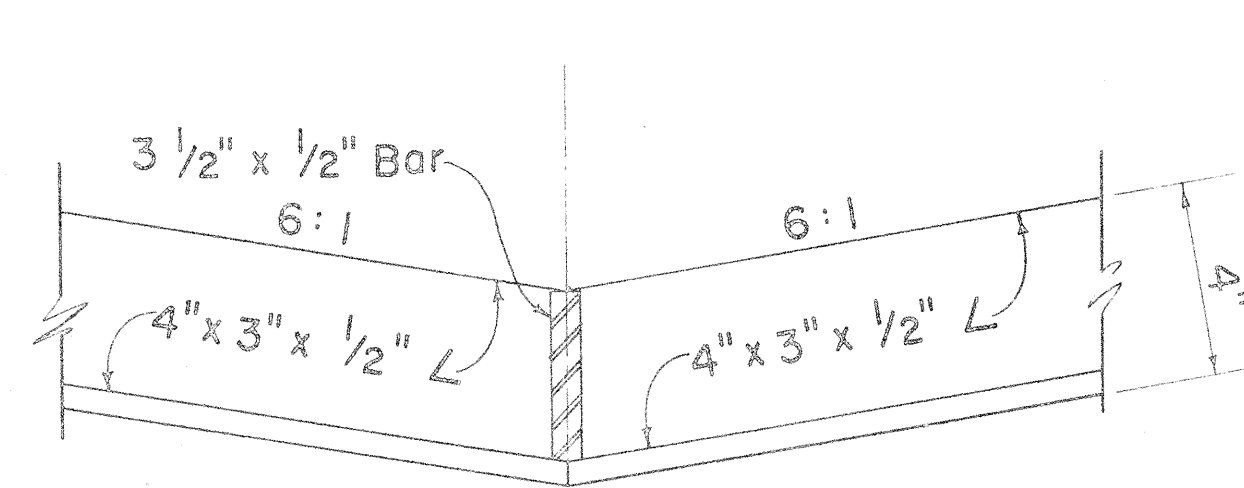
SECTION

Scale: $1\frac{1}{2}" = 1'-0"$



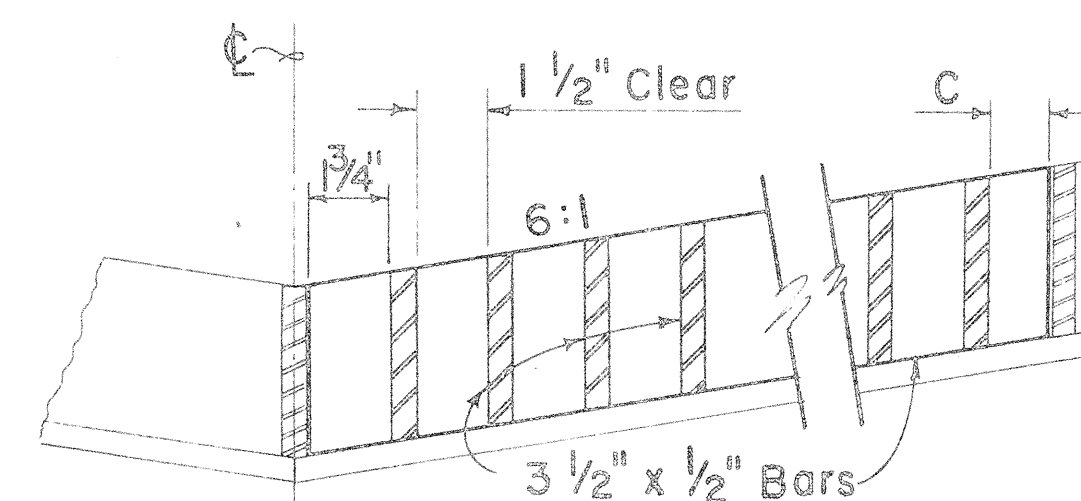
SECTION

Scale: $1\frac{1}{2}" = 1'-0"$



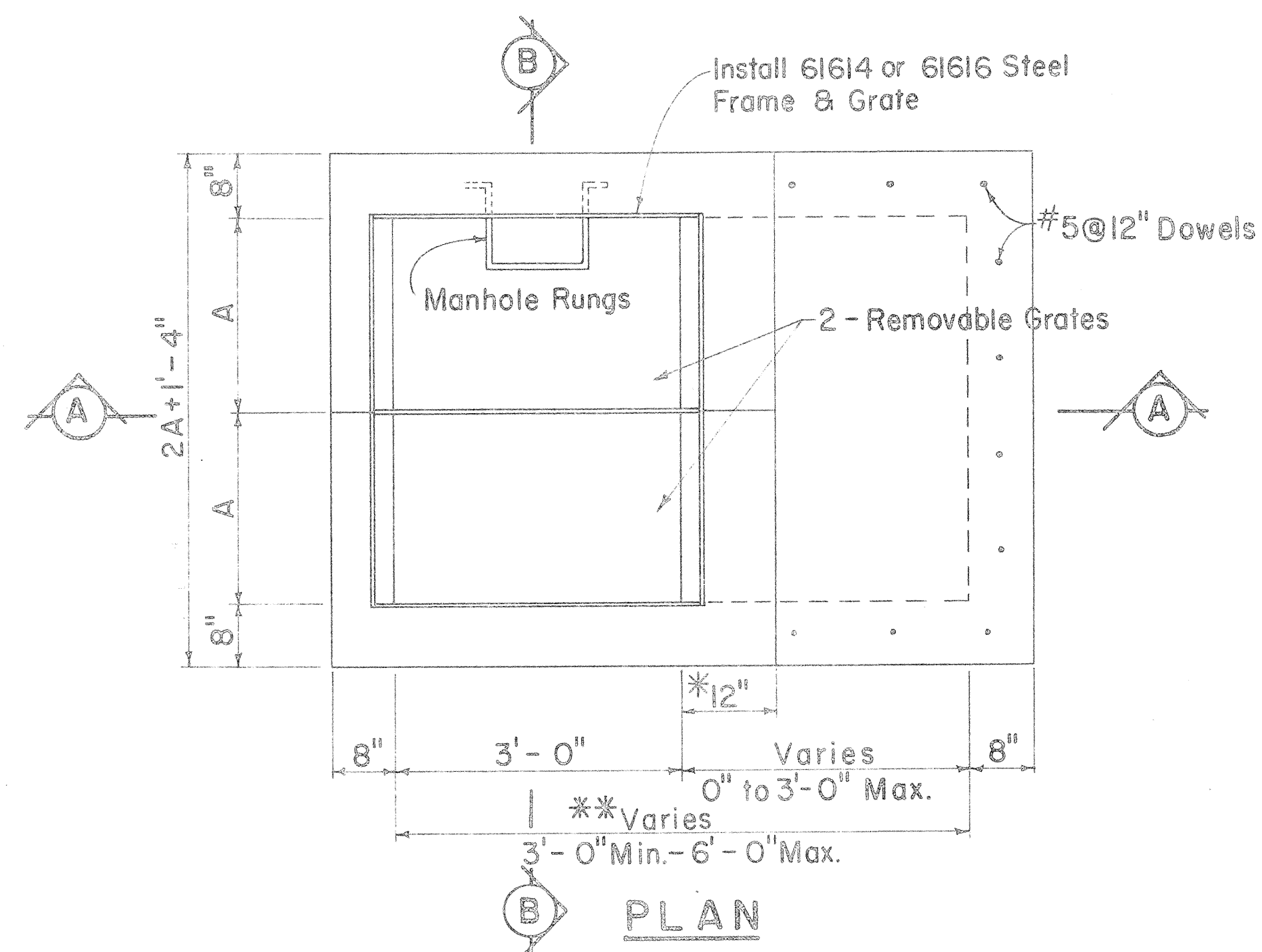
FRAME

Scale: 3" = 1' - 0"

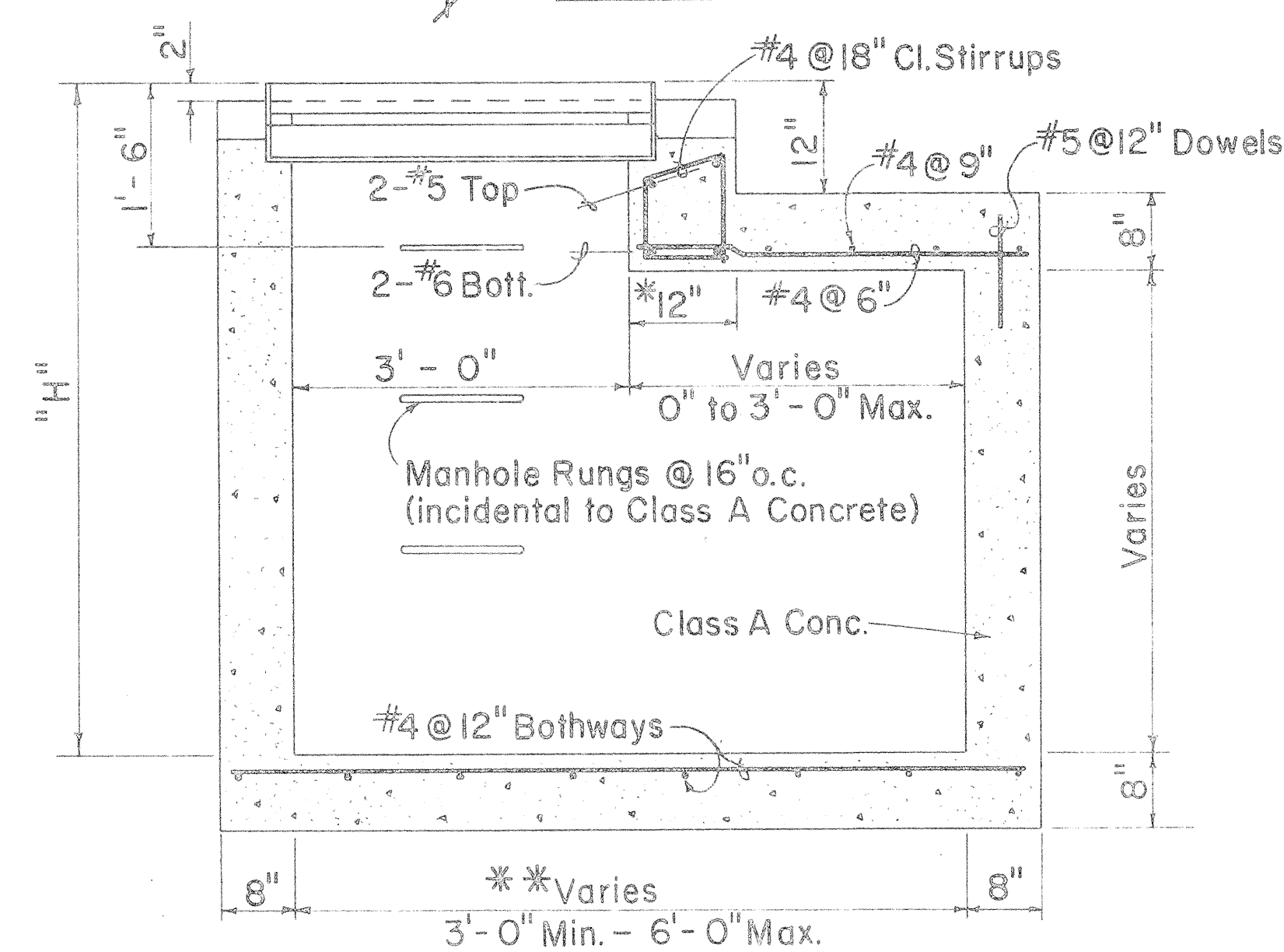


GRATE

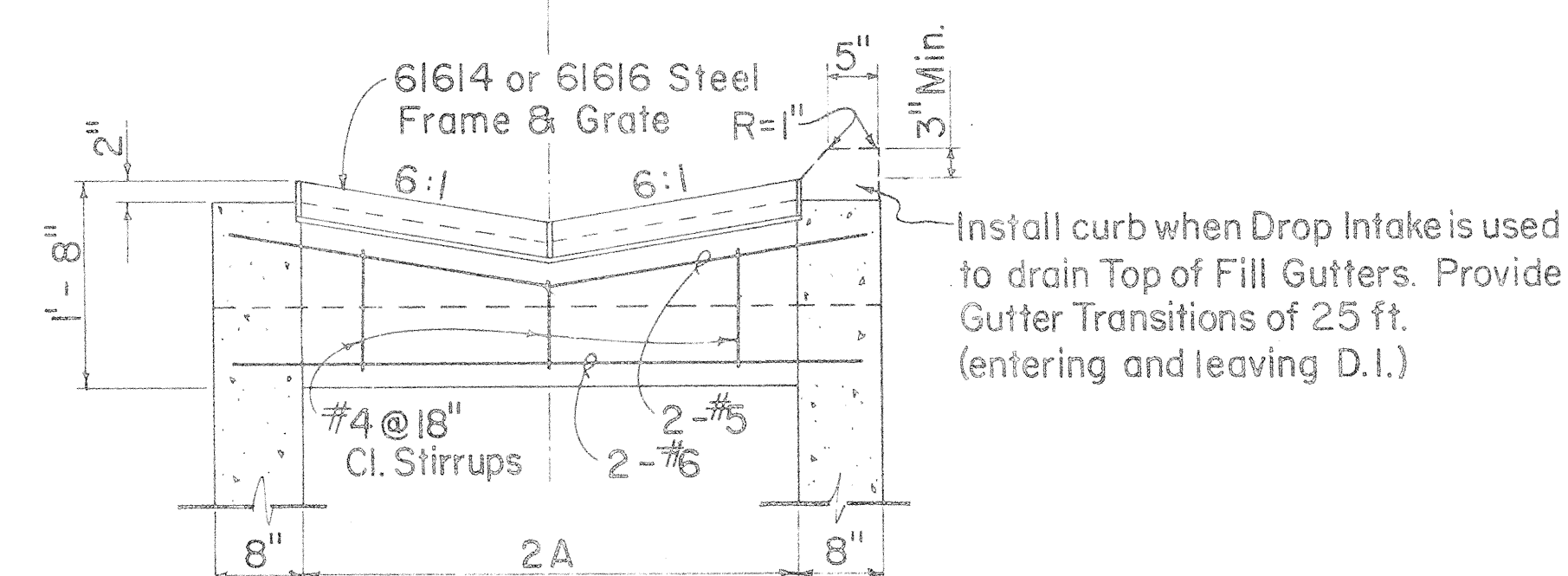
Scale: 3" = 1' - 0"



PLAN



SECTION A - A



SECTION B - B

DETAILS OF 61614 OR 61616 DROP INTAKE

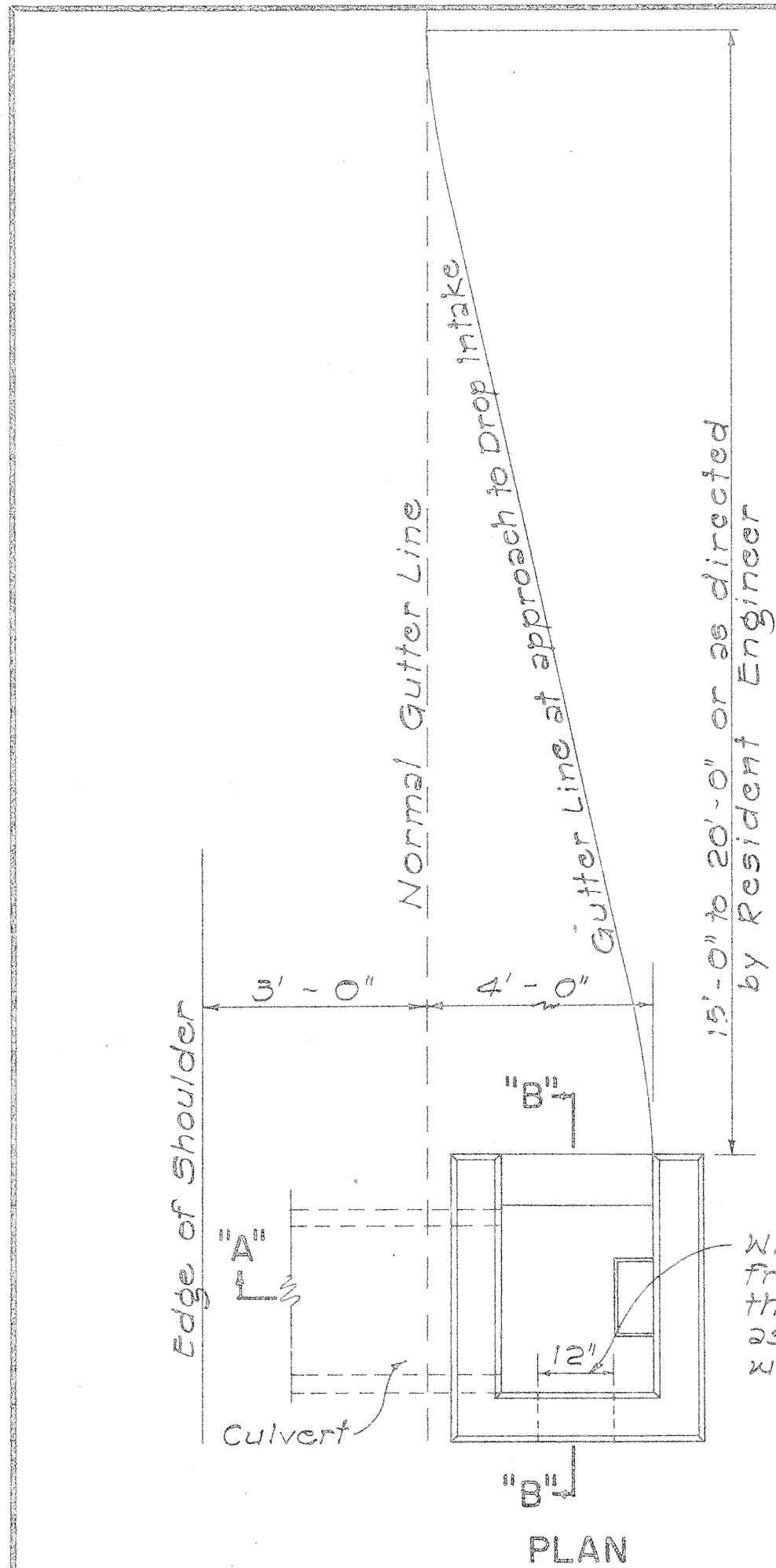
Scale: $\frac{3}{4}" = 1' - 0"$

*For Minimum size box of 3'-0", use 8" and eliminate reinforcing steel shown in the top portion.
 **For Culverts larger than 30", the minimum dimension shall be D'.

* * For Culverts larger than 30", the minimum dimension shall be D'.

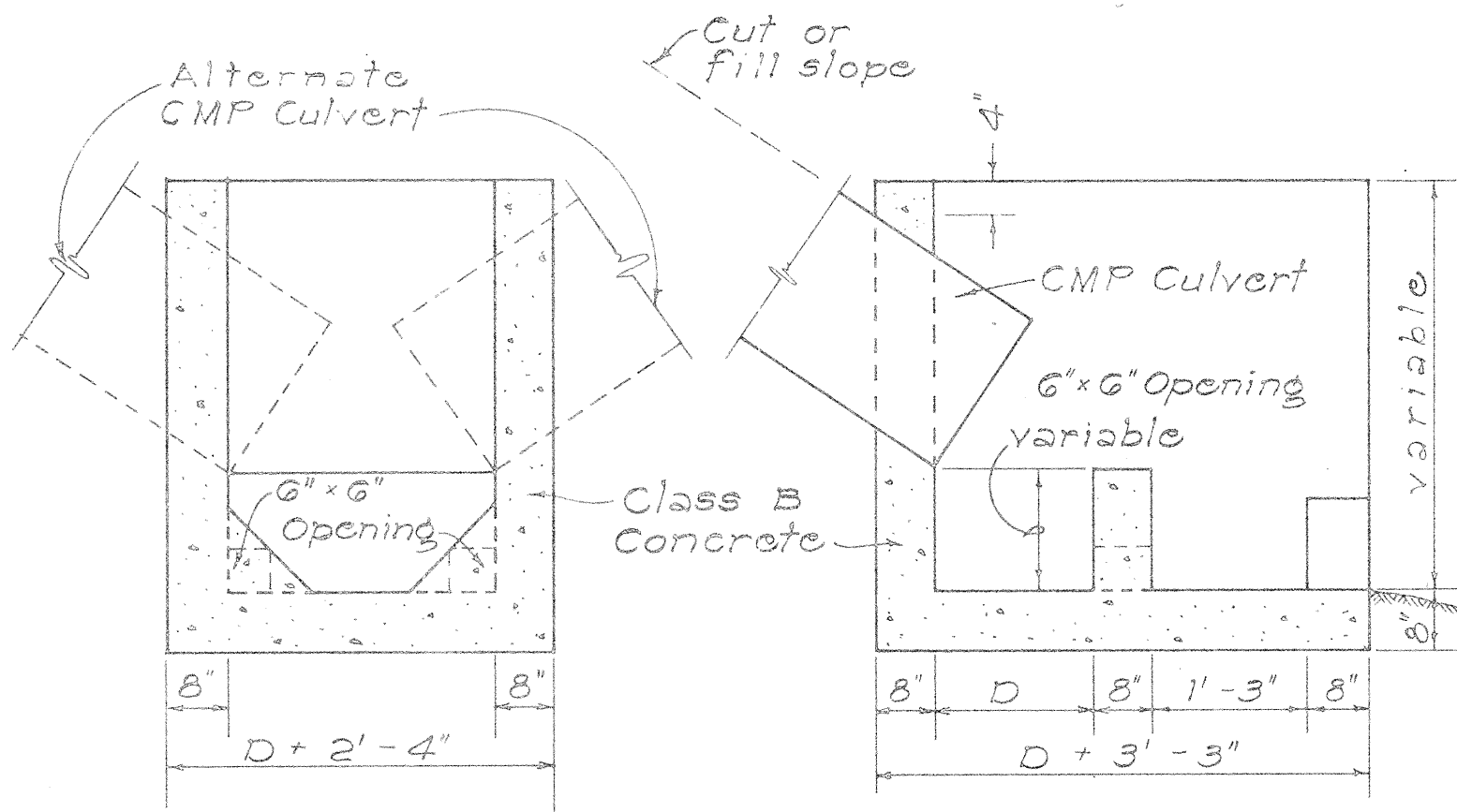
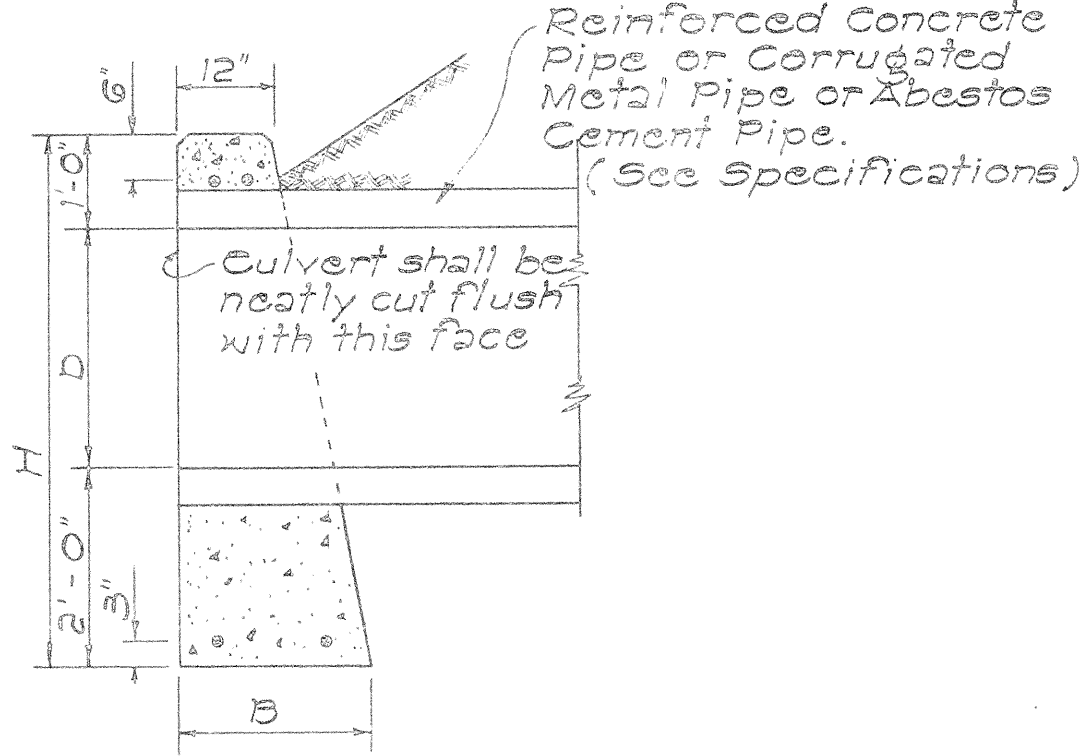
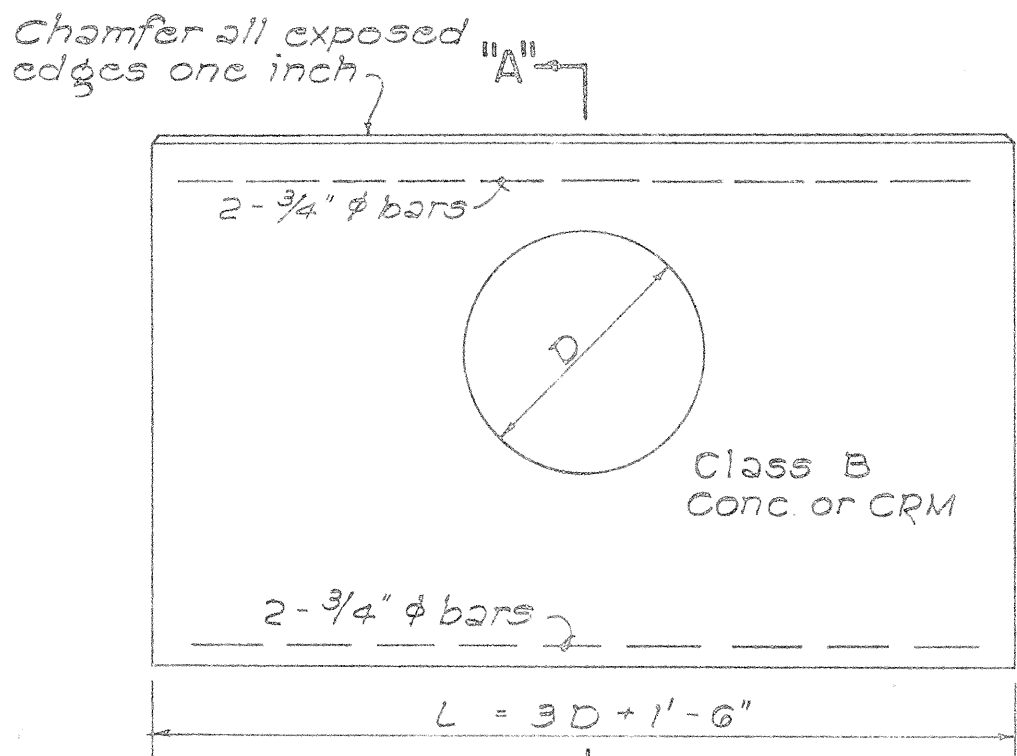
ORIGINAL PLAN	SURVEY PLOTTED BY.....	DATE.....
	DRAWN BY.....	".....
	TRACED BY.....	".....
	DESIGNED BY.....	".....
	QUANTITIES BY.....	".....
	CHECKED BY.....	".....
No.....		

FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1974	55	100



DATA - CONC. DROP INTAKE					Where Variable Equals
D	L	D+6"	S	Cu. Yds.	
23"	18"	2'-5"	8"	1.41	4'-6"
30"	24"	3'-0"	8"	1.72	5'-6"
37"	30"	3'-7"	9"	2.32	5'-6"
44"	36"	4'-2"	9"	2.73	6'-0"
51"	42"	4'-9"	10"	3.54	6'-0"
58"	48"	5'-4"	10"	4.01	7'-0"

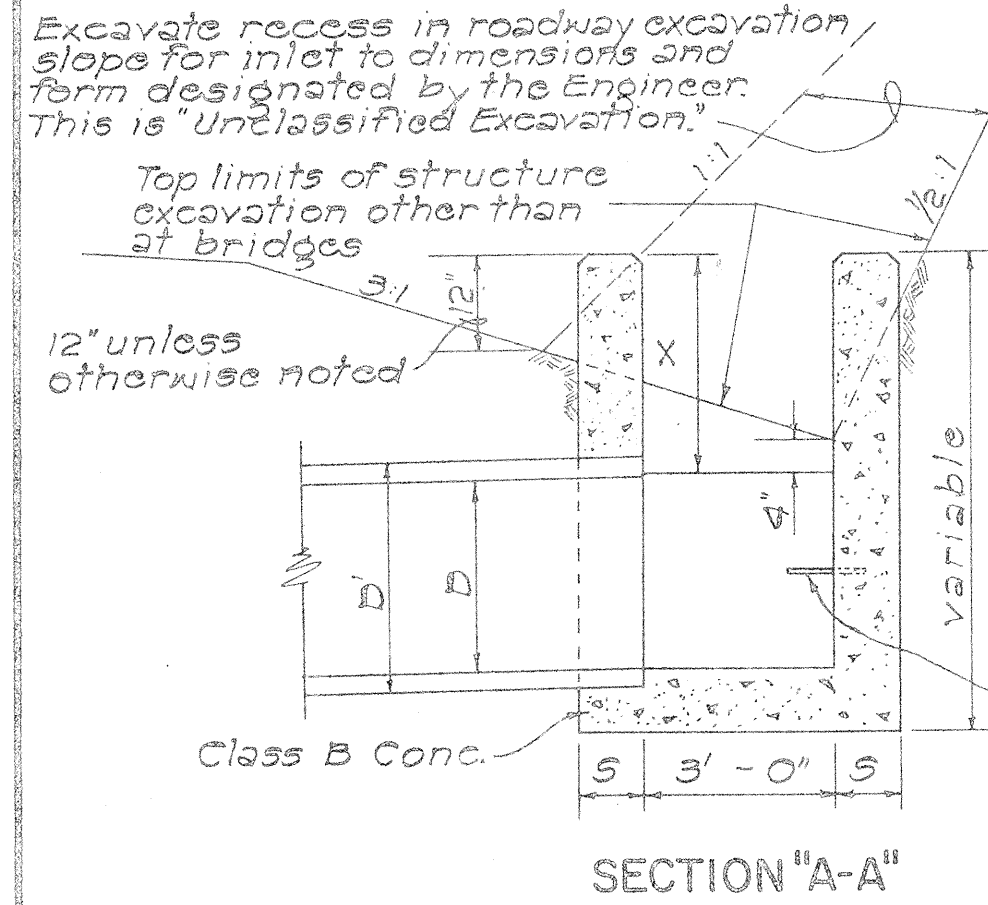
Note: Dimension "X" is assumed as 2'-4" in figuring the above quantities.



DATA FOR CONC. HEADWALL				CL. B CONC. FOR R.C.P.	CL. B CONC. FOR C.M.P.	Steel for One Headwall		
D	B	L	H	Cu. Yd.	Cu. Yd.	No. of Bars	Size	Length
18"	1'-0"	6'-0"	4'-6"	1.12	1.17	4	3/4"	5'-6"
24"	1'-6"	7'-0"	5'-0"	1.52	1.60	4	3/4"	7'-0"
30"	2'-0"	9'-0"	5'-6"	2.36	2.49	4	3/4"	8'-6"
36"	2'-0"	10'-6"	6'-0"	2.94	3.13	4	3/4"	10'-0"
42"	2'-6"	12'-0"	6'-6"	4.19	4.47	4	3/4"	11'-6"
48"	2'-6"	13'-6"	7'-0"	5.01	5.36	4	3/4"	13'-0"

DATA - MASONRY HEADWALL				CRM FOR R.C.P.	CRM FOR C.M.P.
D	B	L	H	Cu. Yd.	Cu. Yd.
18"	1'-0"	6'-0"	4'-6"	1.24	1.29
24"	2'-0"	7'-6"	5'-0"	1.83	1.92
30"	2'-3"	9'-0"	5'-6"	2.56	2.70
36"	2'-6"	10'-6"	6'-0"	3.43	3.66

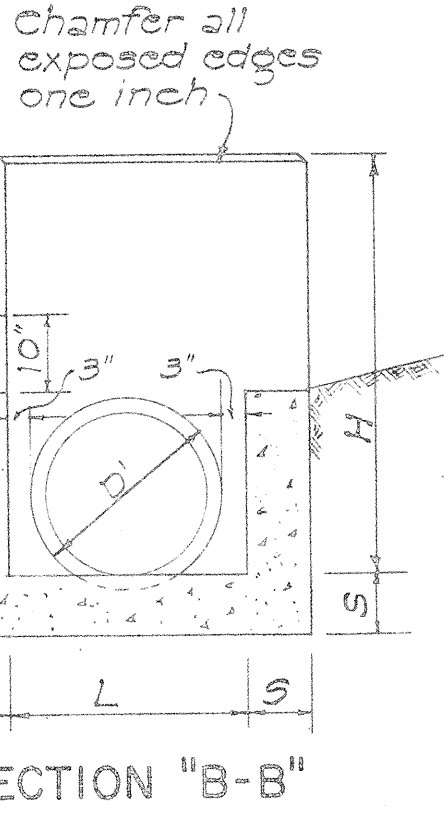
DETAIL OF HEADWALL
Scale: 1/2" = 1'-0"



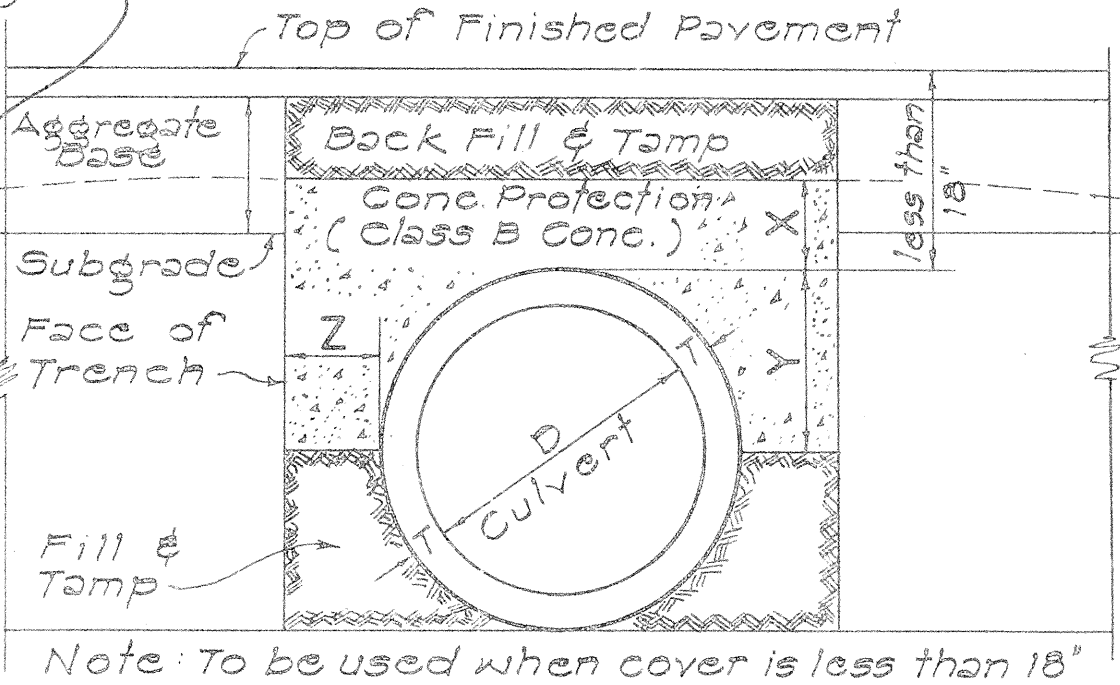
DETAIL OF CONCRETE DROP INTAKE
Scale: 1/2" = 1'-0"

GENERAL NOTES

- Culvert shall enter and leave Drop Intake from any position and in the direction indicated by the plans or ordered by the Engineer.
- D shall be the maximum outside dimension of the culvert at the Drop Intake wall.
- Manhole Rungs (16" o.c.) are required when "H" is greater than 4 feet 6 inches. Only one rung (12 inches from the bottom) is required if "H" is 4 feet 6 inches or less. Manhole Rungs may be placed at any location as ordered by the Engineer.

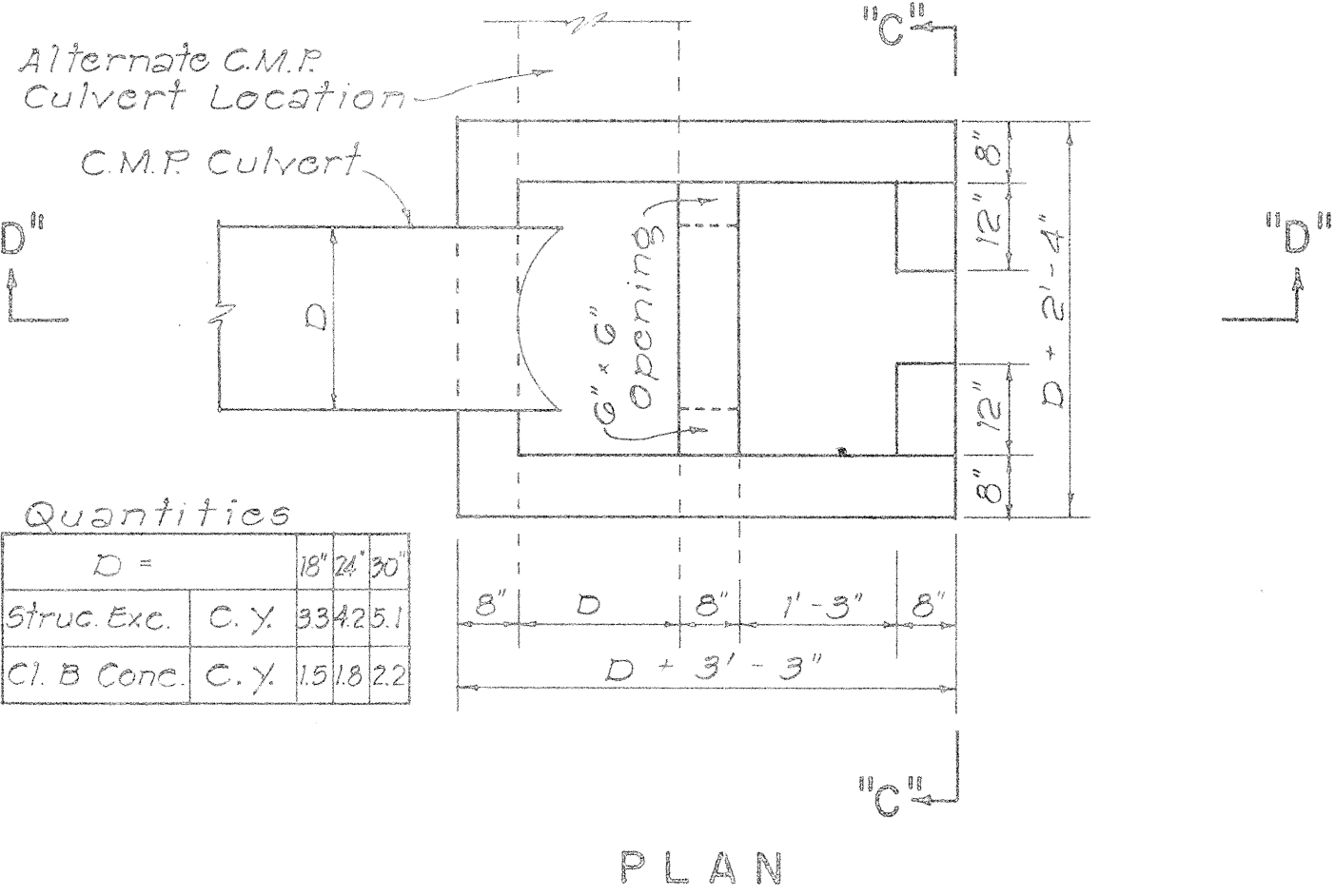


Note: When subgrade is below top of jacket, it shall be fully compacted to this line and then re-excavated (struc. exc.) to proper subgrade. This surface shall be rolled again.



DATA FOR CONCRETE PROTECTION OVER CULVERTS		
X	Y	Z
6" for 18" D	$\frac{D}{2} + T$	Z must be from pipe to face of trench
7" for 24" D		Minimum = X
8" for 30" D		Maximum pay quantity will be Z = 12"
9" for 36" D		
10" for 42" D		
11" for 48" D		
12" for 54" D		

SECT. OF CULVERT WITH CONC. PROTECTION
Scale: 1" = 1'-0"



DETAILS OF CONC. DROP BOX AT
OUTLET OF CULVERT PIPE
NOT TO SCALE

APPROVAL, RECOMMENDED:
P. J. J. J.
HYDRAULIC DESIGN ENGINEER
12-17-69
DATE

APPROVED:
John J. J.
ASSISTANT CHIEF, ENGINEERING
12-17-69
DATE

NO.	REVISION	APPROVED BY	DATE

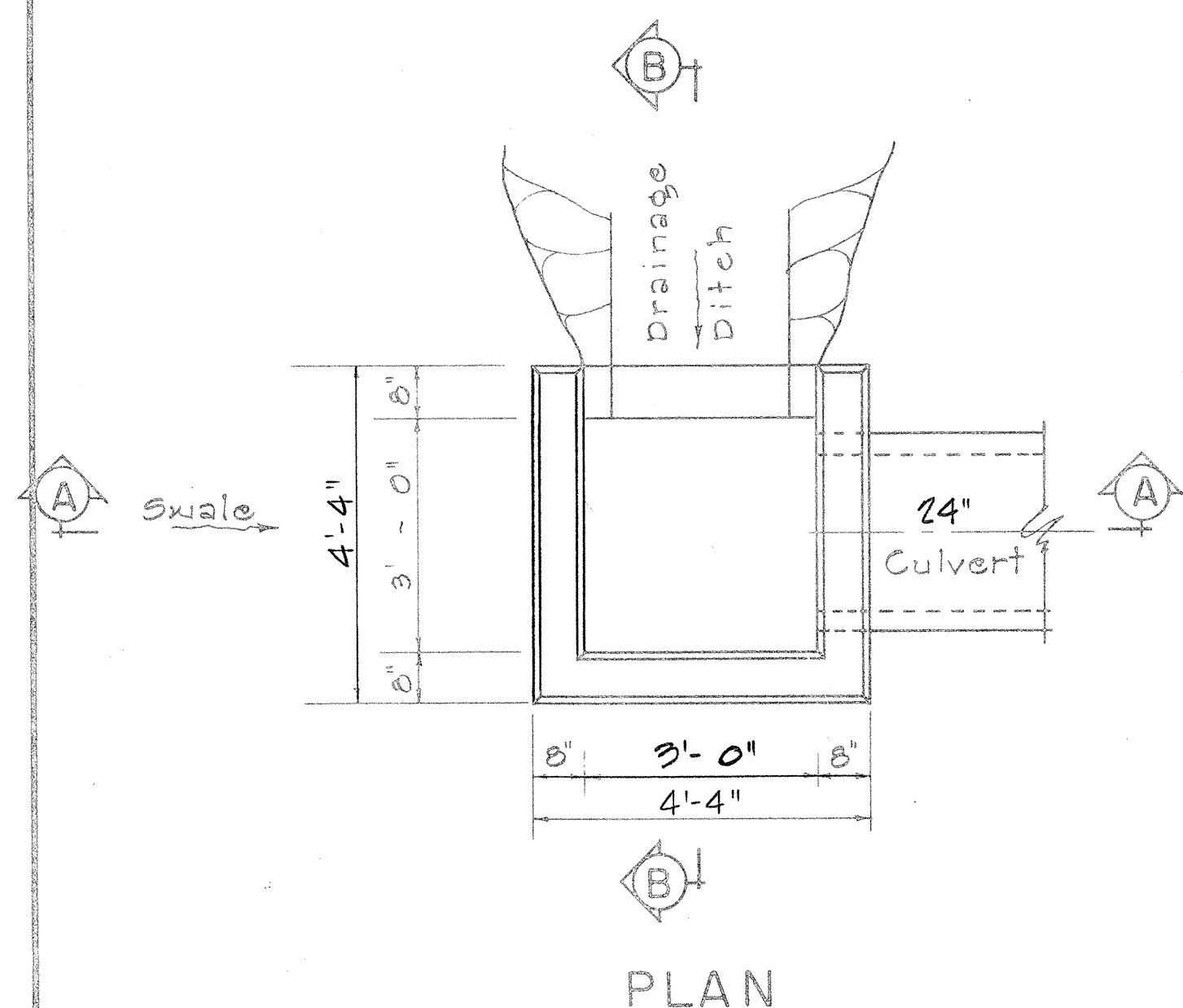
STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
DROP INTAKE, HEADWALL &
CONCRETE PROTECTION

Scale: As Noted
Date: Aug. 1967
SHEET No. 7 OF 8 SHEETS
DH 10

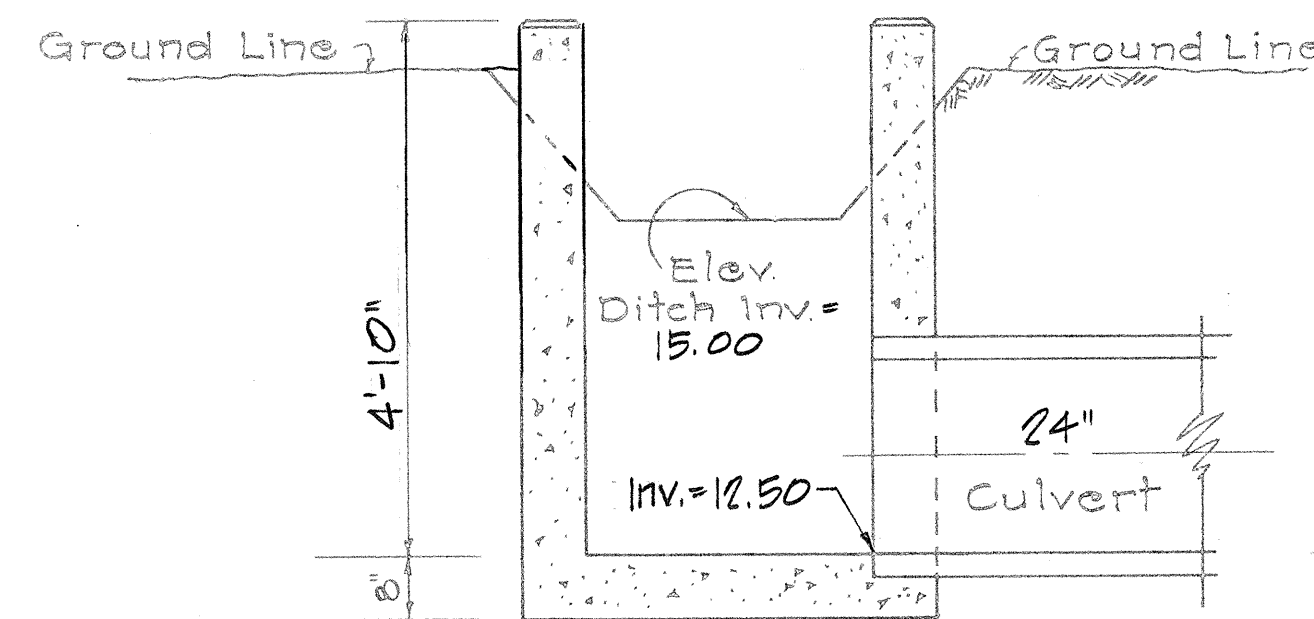
FED. ROAD DIST. NO.	STATE	FED. AID PROJ. NO.	FISCAL YEAR	SHEET NO.	TOTAL SHEETS
HAWAII	HAW.		1974	56	100

GENERAL NOTES

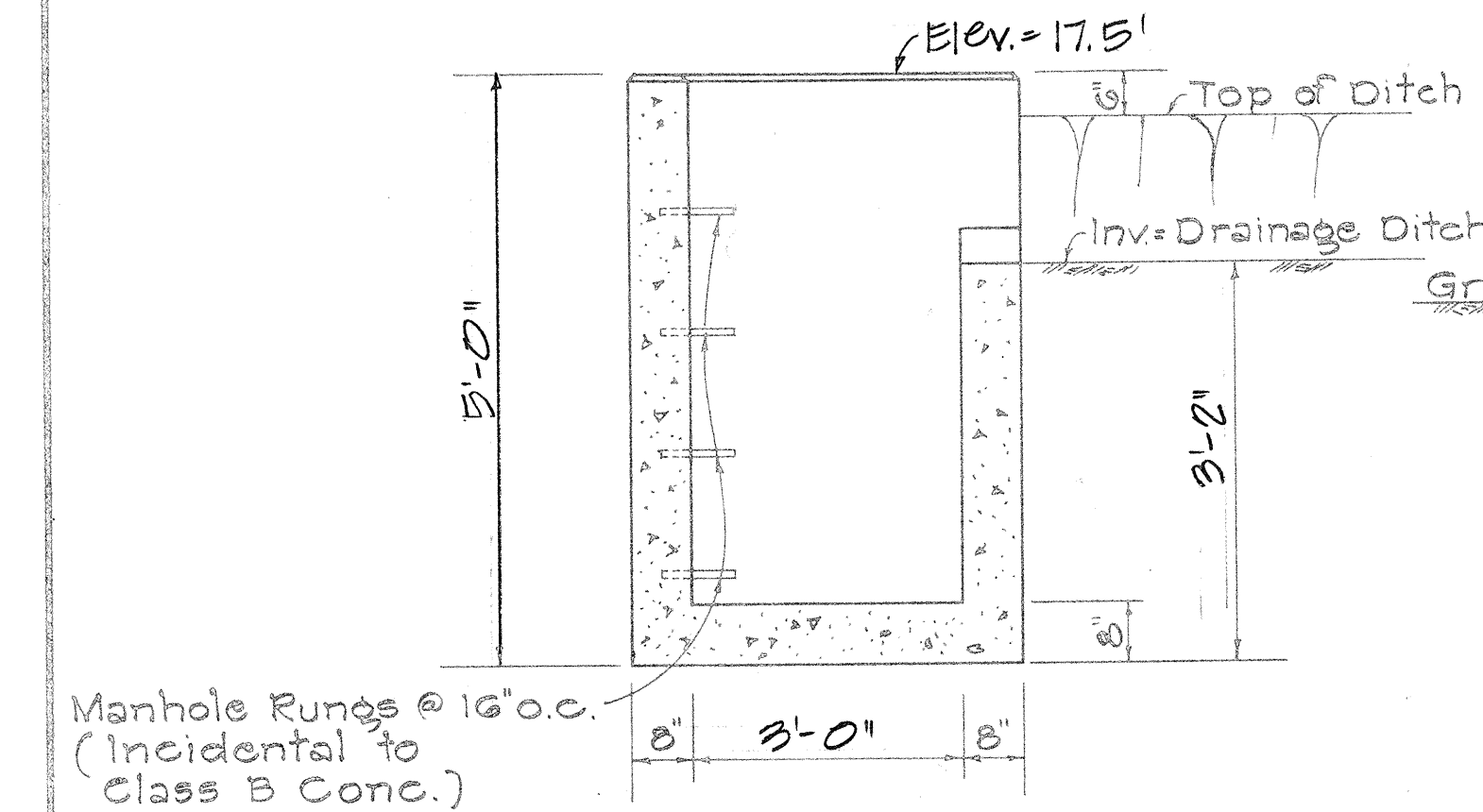
- All concrete shall be Class "B" unless otherwise noted.
- Exposed edges of all drainage structures shall be chamfered one inch.
- Culvert shall enter and leave Drop Intake from any position and in the direction indicated by the plans or ordered by the Engineer.
- Manhole Rungs (16" o.c.) are req'd. when "H" is greater than 4'-6". Only one rung (12 inches from the bottom) is required if "H" is 4'-6" or less. Manhole Rungs may be placed at any location as ordered by the Engineer.



PLAN



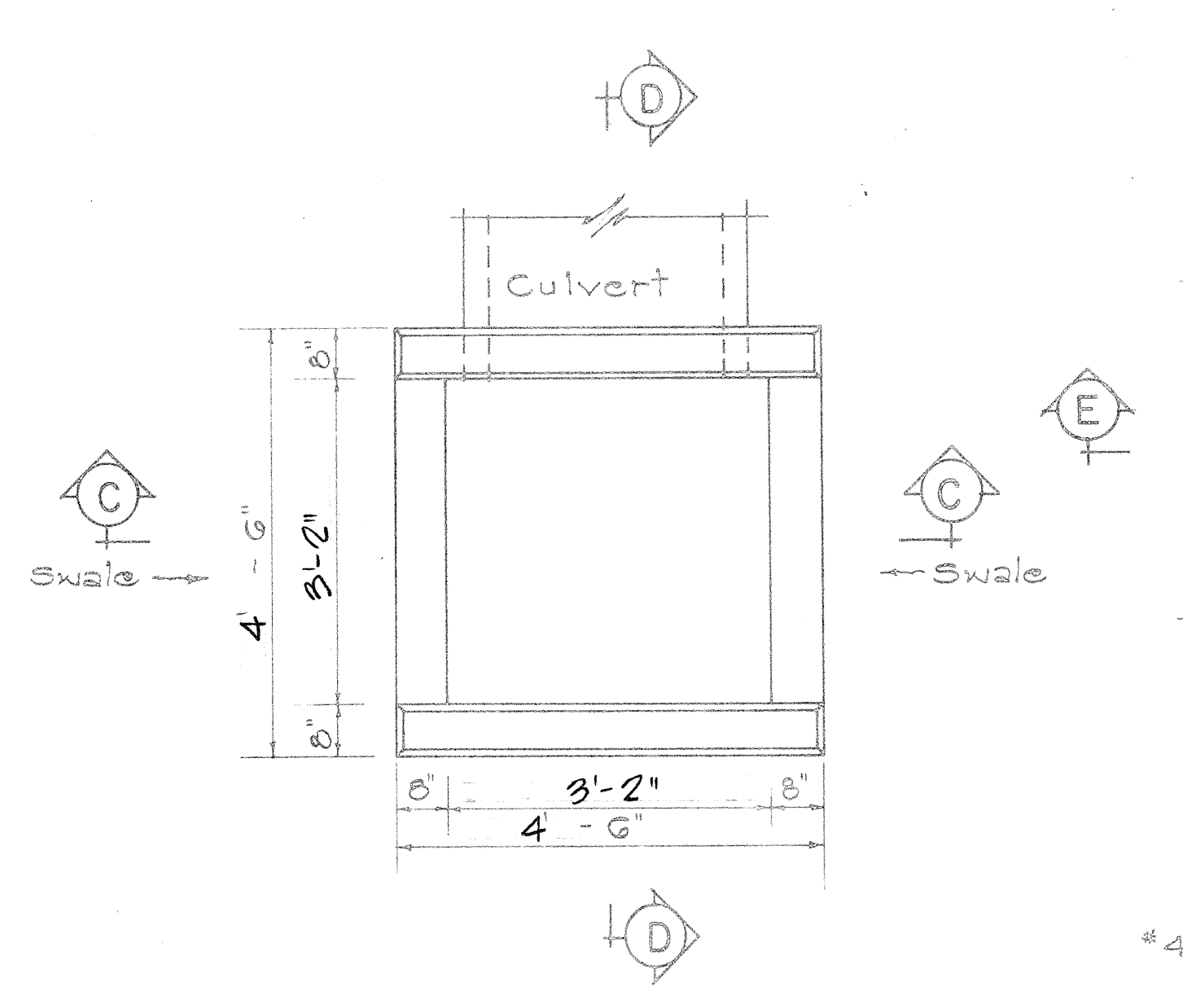
SECTION "A-A"



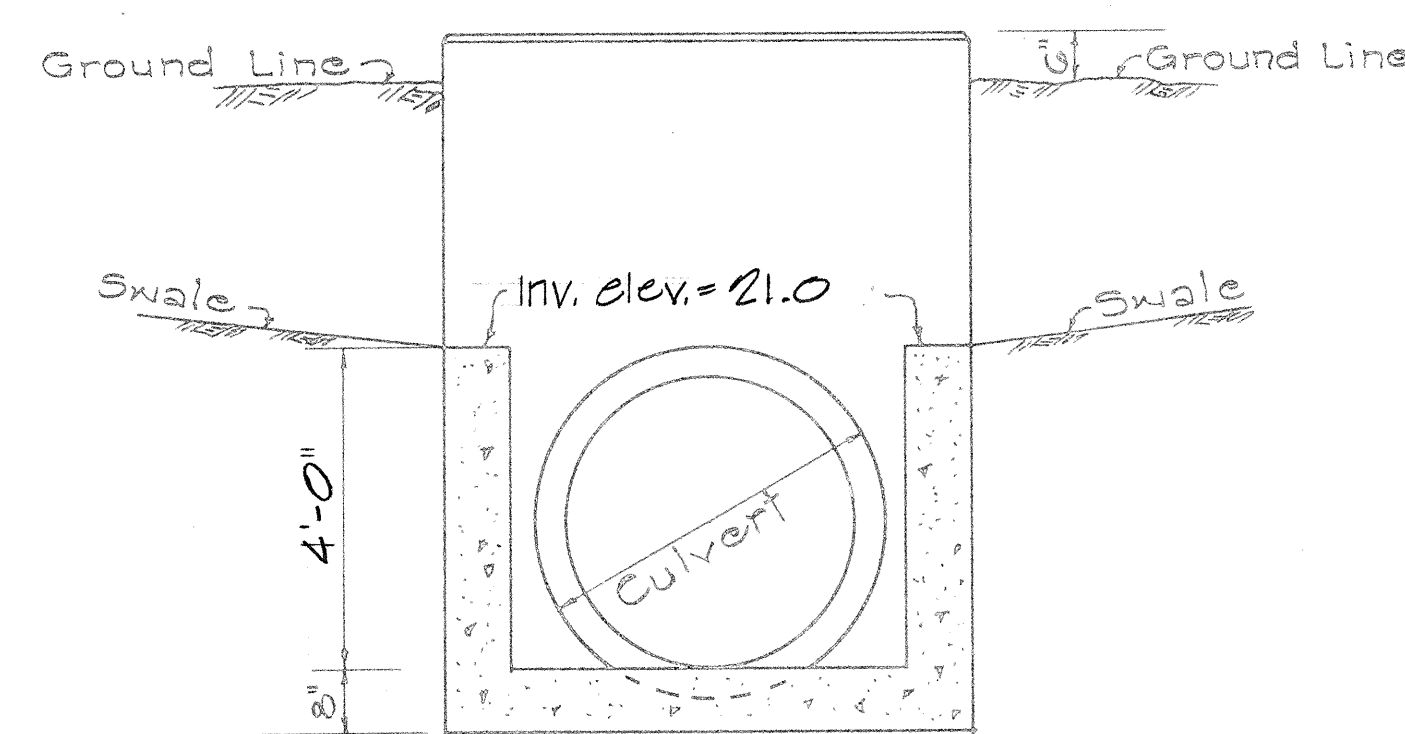
SECTION "B-B"

TYPE "A" CONCRETE DROP INTAKE

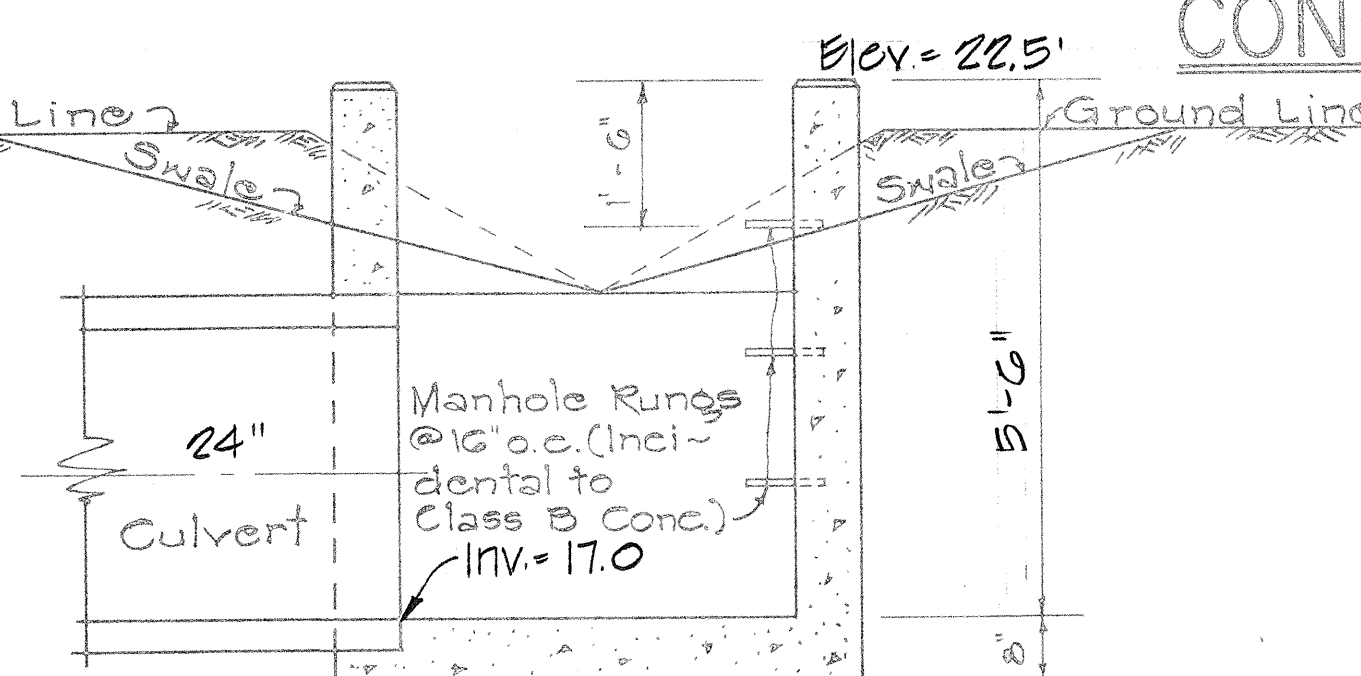
Scale: 1/2" = 1'-0"



PLAN



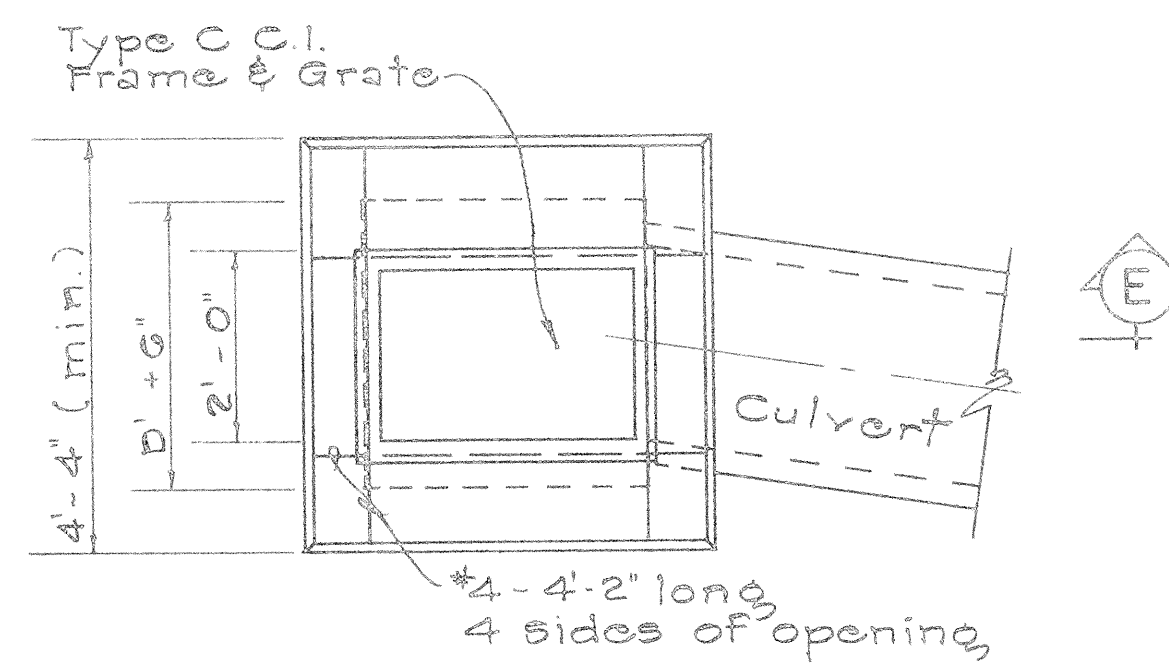
SECTION "C-C"



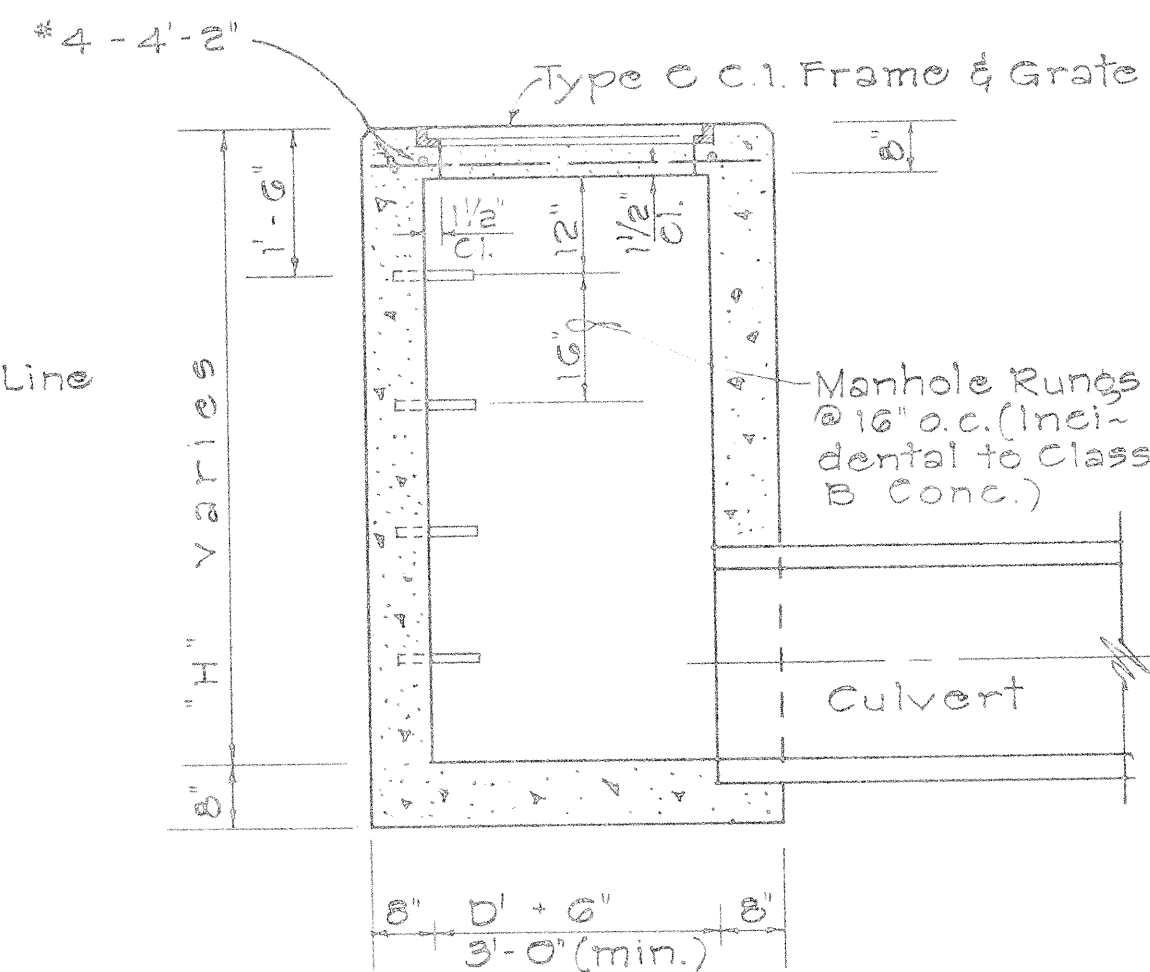
SECTION "D-D"

TYPE "B" CONCRETE DROP INTAKE

Scale: 1/2" = 1'-0"



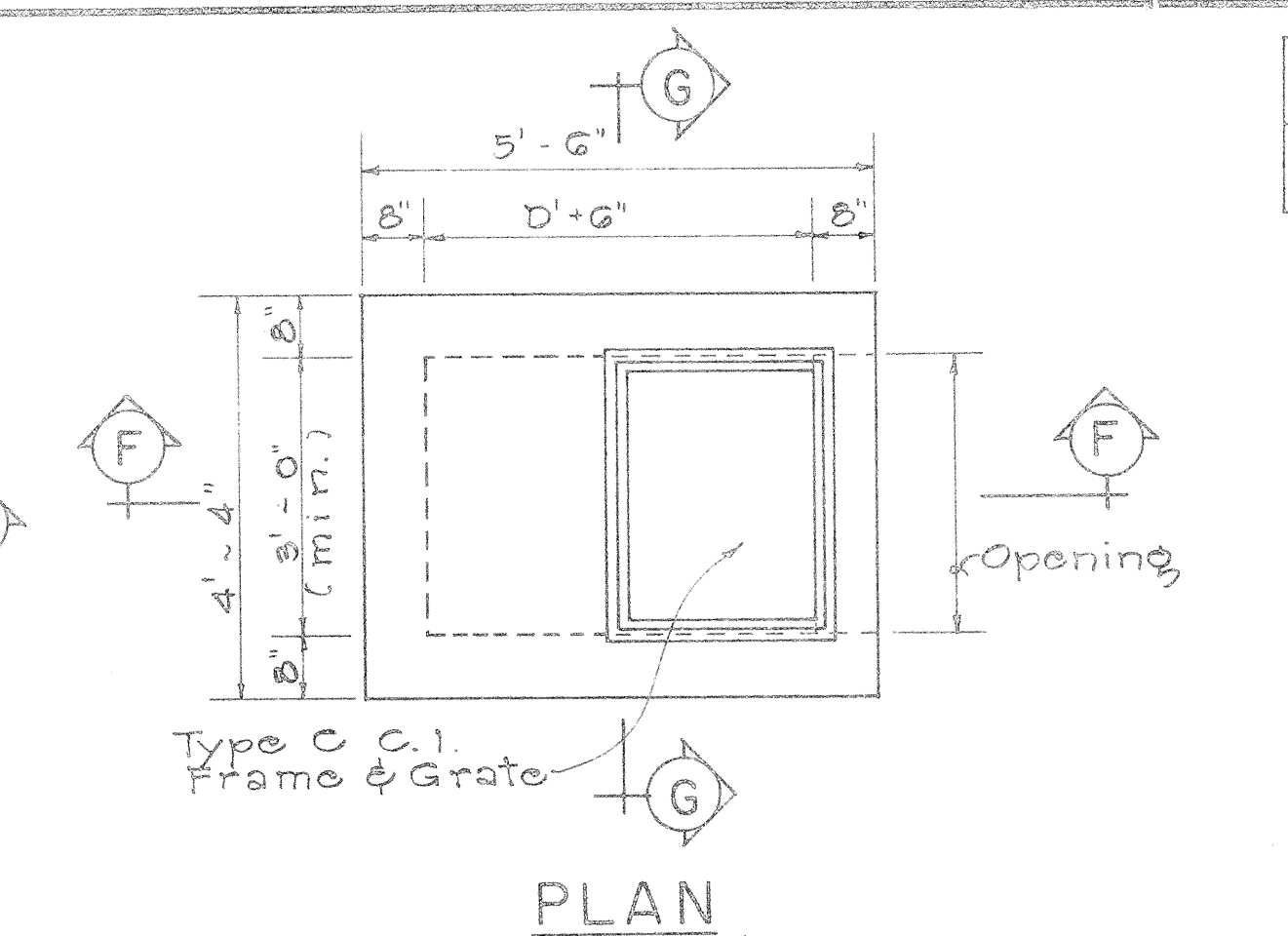
PLAN



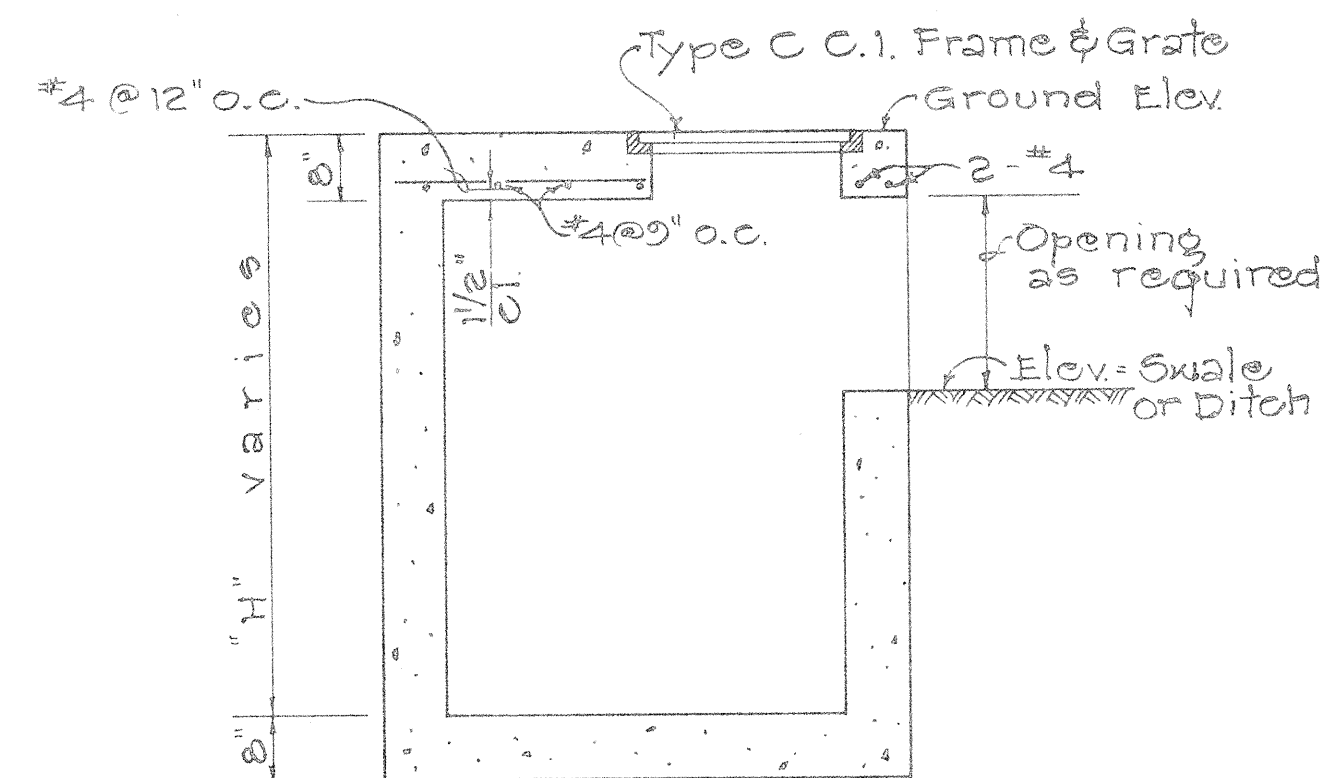
SECTION "E-E"

TYPE "C" GRATED CONCRETE DROP INTAKE

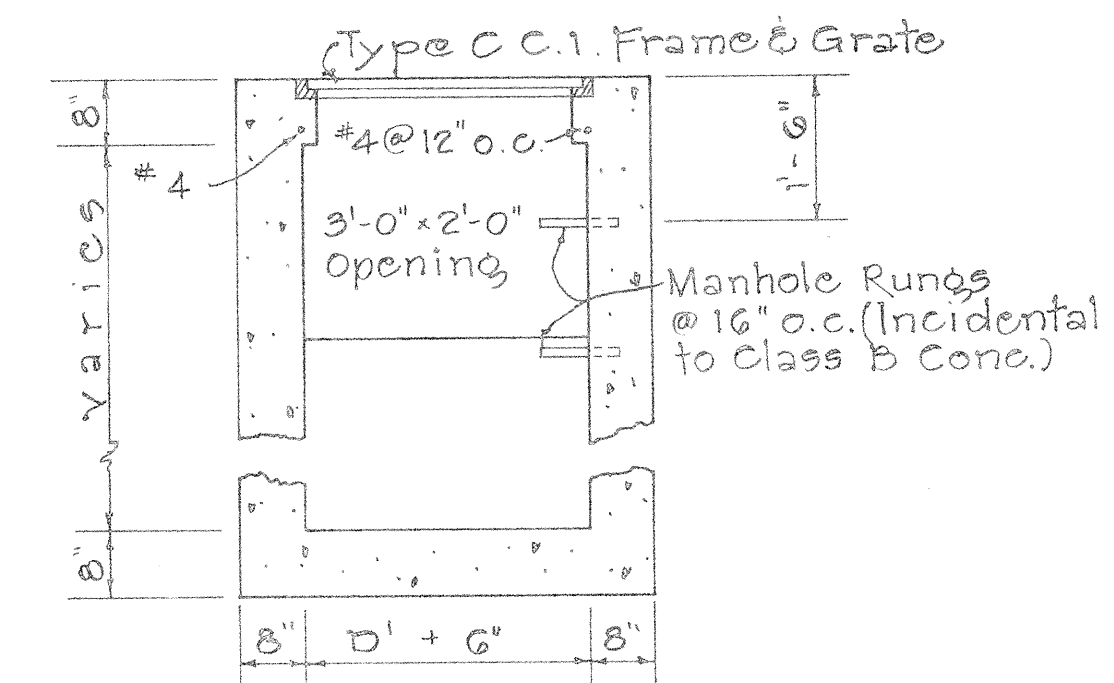
Scale: 1/2" = 1'-0"



PLAN



SECTION "F-F"



SECTION "G-G"

TYPE "D" GRATED CONCRETE DROP INTAKE

Scale: 1/2" = 1'-0"

APPROVAL RECOMMENDED:
HYDRAULIC DESIGN ENGINEER
12-17-69
DATE

APPROVED:
ASSISTANT CHIEF, ENGINEERING
12-17-69
DATE

NO.	REVISION	APPROVED BY	DATE

STATE OF HAWAII
DEPARTMENT OF TRANSPORTATION
HIGHWAYS DIVISION
STANDARD DETAILS
TYPE "A", "B", "C", AND "D"
CONCRETE DROP INTAKE

Scale: As Noted
Date: July, 1969
SHEET NO. 8 OF 8 SHEETS
DH19